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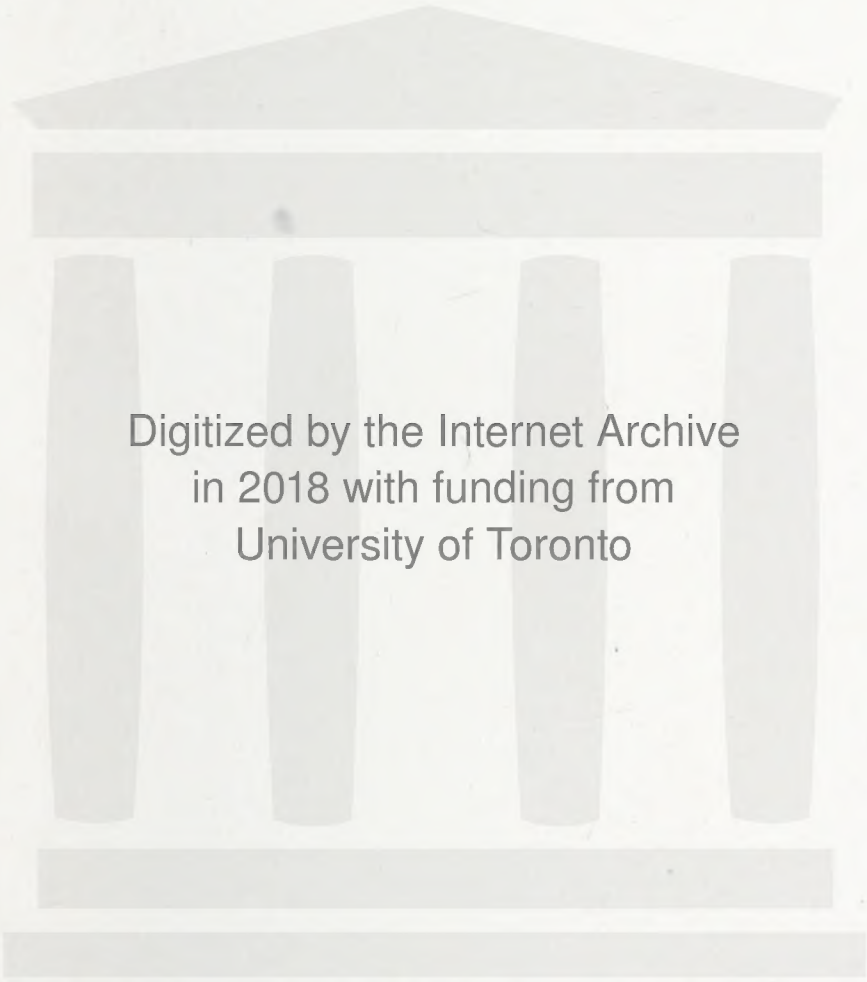
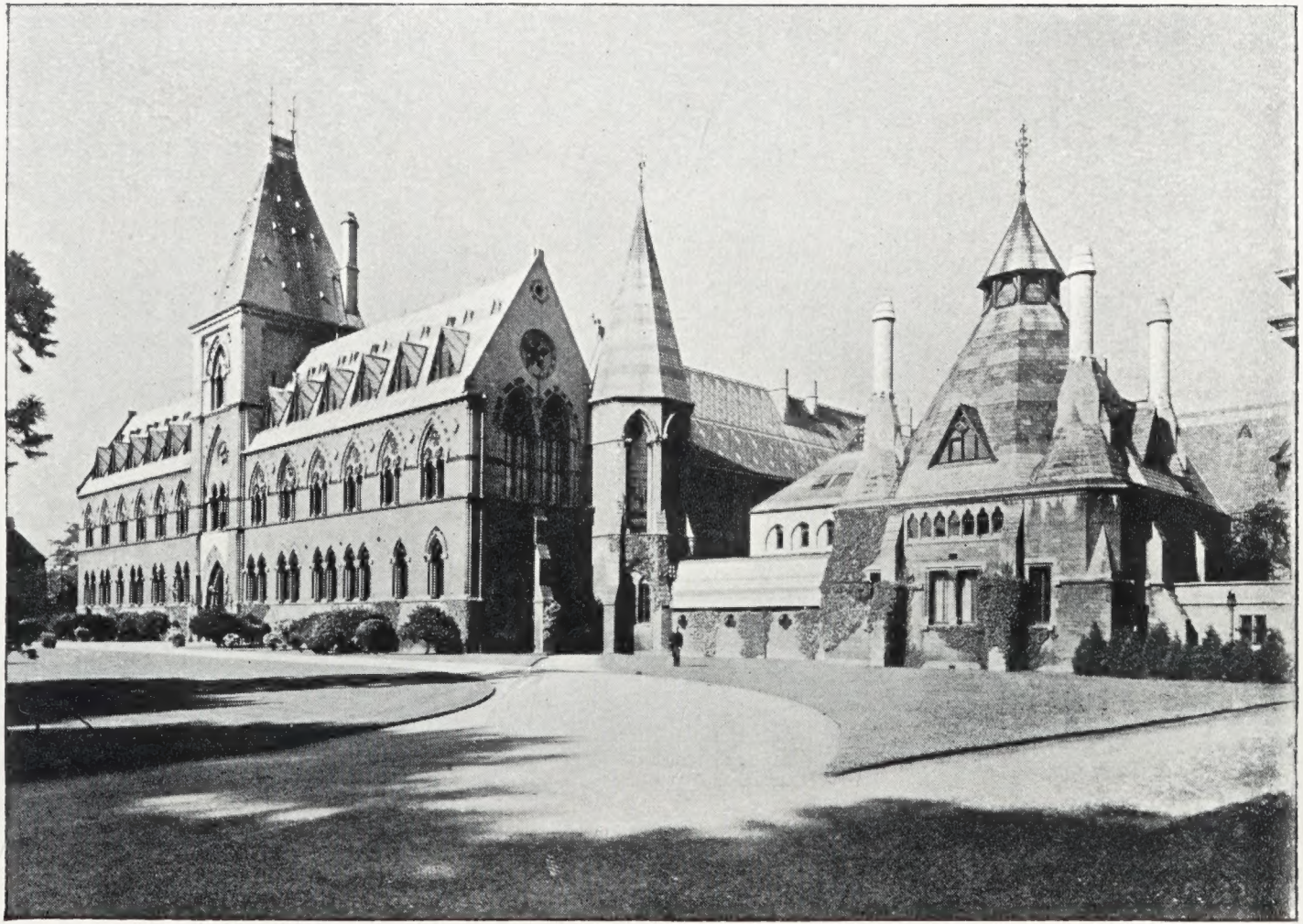


PLATE I



THE MUSEUM FROM THE SOUTH-WEST

A History of The Oxford Museum

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PREFACE

THE writing of this little book arose out of the Jubilee celebration of the Oxford Museum held last year. It was thought that students of the present and future, who enjoy freely the buildings and collections for which their predecessors strove and toiled, might take an interest in hearing something of the chequered history of science in its earlier days in Oxford, and of the founding and completion of the great scientific institution which has now attained its fiftieth year. This history was to have been published many months since, but has been delayed by various mischances and accidents for which we are not responsible. Professor G. C. Bourne collected some materials for the early history, and we are much indebted to him for them, and have incorporated a great part of them in our first chapter. In writing the second chapter we were in rather a dilemma. We should have liked to quote Dr. Vernon Harcourt's most instructive and entertaining address upon the early history of the Museum as it stood, but as there was

in addition much other material which he had not time to include, we were reluctantly compelled to adopt the plan of writing a consecutive history, in which frequent quotations from Dr. Harcourt's address are introduced. By this means we were able to quote also from the very interesting reminiscences with which Professor Story-Maskelyne and Professor Boyd Dawkins have been kind enough to furnish us.

The fifth and last chapter contains an account of the proceedings on Oct. 8, 1908. It is largely drawn from the pages of the *British Medical Journal*, by permission of the editor.

The illustrations are for the most part reproduced from photographs kindly taken for us by Mr. Alfred Robinson, and Miss Acland has been good enough to allow us to use her well-known portrait of Acland and Ruskin.

October, 1909.

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CHAPTER I

THE BEGINNINGS OF SCIENTIFIC STUDY IN OXFORD

The dawn of modern science in Oxford was a brilliant one. Circumstances were for the moment favourable, for, after the fall of the city to the Parliamentarians, there was in Oxford, as compared with London, peace, and the temporary repression of the forces of orthodoxy by the Parliament was not disadvantageous. Indeed, one or two of the pioneers were actually Anglican priests, who had been driven to seek their living by medicine. Thus Oxford became the cradle of the infant Philosophical Society. 'About the year 1645,' wrote Dr. Wallis, one of its earliest members and its first secretary, 'there had sprung up an association of certain worthy persons inquisitive in Natural Philosophy, who met together first in London for the investigation of what was called the new or experimental philosophy, and afterwards several of the more influential of the members, about 1648 or '49, finding London too much distracted by civil commotions, commenced holding their meetings in Oxford.' They met first at Wadham, in that 'resort of vertuous and learned

men', the house of its enlightened Warden, Dr. Wilkins, where they no doubt sometimes enjoyed the 'Concerts of Musick', for giving which he was famous.

Wilkins, the son of an Oxford goldsmith, had been made Warden by Cromwell, but men of all opinions gladly met under his roof, and Cavalier parents did not fear to send their sons to Wadham. Wilkins was Evelyn's 'deare and excellent friend', and was given 'a rare burninge glasse' by him.

John Wallis, quoted above, had also taken part in the London meetings of the Philosophical Society, and was made Savilian Professor of Geometry in 1649 as a reward for his cleverness in reading Royalist ciphers. While in Oxford he published several mathematical works, gave a fine collection of ciphers to the Bodleian, and made his peace with the ruling party at the Restoration by explaining that he had taken care not to decipher many letters that 'concerned the public safety'. He was consulted by the Government about the adoption of the Gregorian Calendar, but was opposed to it, as showing 'undue subserviency to the Papacy'.

Thomas Willis and Ralph Bathurst were both driven by the troubles of the time to practise medicine in Oxford, and were both members of the Philosophical Society. Willis, who married Dr. Fell's sister, lived at Beam Hall, where the services of the English Church were carried on in secret, and he sometimes acted as Archdeacon at private Ordinations. But he published several medical works, made his fortune by discovering

and popularizing a medicinal spring at Astrop, and from 1660 to 1666 was Sedleian Professor of Natural Philosophy. Bathurst became President of Trinity in 1664, and re-built the Chapel and the Quadrangle facing the garden; he was a popular and jovial character, and used to prowl after nightfall in the grove to whip out any naughty scholars whom he might find there.

Amongst the members of this Philosophical Society were William Petty, an Oxford M.D. and Fellow of B.N.C., who was afterwards famous for his survey of Ireland for the Commonwealth, and Thomas Millington, who is believed to have discovered the sexuality of plants, and who was Sedleian Professor of Natural Philosophy from 1675 to 1704, but performed his duties by deputy. There was also Dr. Seth Ward, who began life at Cambridge, and was expelled thence by the Puritans, but so far mastered or disguised his feelings that he accepted the Savilian Professorship of Astronomy from the Commonwealth. Out of admiration for Wilkins he entered himself as a Fellow Commoner at Wadham. He revived the practice of Astronomy lectures, which had fallen into disuse, and joined Wallis in refuting Hobbes's mathematical and physical errors. He was elected Principal of Jesus, but Cromwell made another appointment. In 1659 he was elected President of Trinity, but he was not properly qualified for the post, and in 1660 was obliged to give way to its former holder. At the Restoration he became once more an ardent Royalist, and was successively Bishop of Exeter and Salisbury. Burnet said that

he was 'a man of great reach, went deep in mathematical studies and was a very dexterous man, if not too dexterous, for his sincerity was much questioned'. He was, of course, one of Anthony à Wood's pet aversions.

Amongst the Wadham undergraduates in Wilkins's time were Sydenham, the famous physician, and Christopher Wren; the latter was an active member of the Oxford Philosophical Society from 1650 to 1657, made experiments on the variations of the barometer, and wrote *Tracts on the Cycloid*, which Wallis published. For the Society he read a paper on 'New designs tending to strength, convenience and beauty in building'. In 1653 he became Fellow of All Souls, but in 1657 went to Gresham College, where the Philosophical Society sometimes held meetings. In 1660 he returned to Oxford as Savilian Professor of Astronomy, and held the Chair until 1673; but he had given up science for architecture before that date, and indeed was building the Sheldonian Theatre as early as 1663.

Most famous of all the men of science was Robert Boyle, who was not a member of the University, but settled in Oxford from 1654 to 1663 in order to enjoy the company of the new philosophers. When Wilkins was moved to Cambridge as Master of Trinity, the Society met in Boyle's lodgings near University College. Here he had contrived to fit up a laboratory, and he employed a chemical assistant and kept other workmen. Several of his books were published at Oxford, and here he invented a kind of air-pump,

and from experiments with it deduced the well-known 'Boyle's Law'.

But this brilliant beginning was unfortunately destined to be only a false dawn for science in Oxford. With the Restoration the hopes of the learned, as of the ambitious, turned towards London, and the little Oxford Philosophical Society was incorporated as the famous Royal Society. It is true that until 1690 a branch remained in Oxford, which was sometimes so active as to rouse the jealousy of the main society. In 1663 Anthony à Wood followed a course of chemistry 'under the noted chimist and Rosicrucian, Peter Sthael of Strasburgh in Royal Prussia, a Lutheran, a great hater of women, and a very useful man', whom Boyle had brought to Oxford. Locke attended his lectures also, but was troublesome and 'scorn'd to take notes'. In 1683 a room in the basement of the newly-built Ashmolean was fitted up as a chemical 'elaboratory'; several scholars 'went a course of chemistry and held Friday afternoon conversations' with Wallis and Bathurst.

But in the long run Oxford orthodoxy and, unhappily, Oxford obscurantism were too strong for experimental science, and it was snubbed and scoffed out of the field of learning. At the opening of the Sheldonian Theatre, built though it had been by a man of science, the University Orator, South, made a violent attack on the Royal Society, declaring that its members were 'underminers of the University'. A little later Hearne spitefully said that the Society 'sinks every day in its credit

both at home and abroad'. The author of its early history had to argue that 'Experiments are not dangerous to the Universities'.

Science could not, of course, be wholly banished from the University where institutions and endowments had been provided for its maintenance, but a perverse ingenuity combined with neglect in wresting as many as possible of these from their purpose. Medicine and Anatomy were supposed to be taught by the Regius Professor, whose Chair was founded by Henry VIII. He also held a Praelectorship in Anatomy, founded by Richard Tomlins in 1623. But his lectures do not seem to have gone much beyond reading the medical classical authors. He had a room, called the 'Schola Medicinae', in the middle storey of the south side of the Schools, but in the eighteenth century it seems chiefly to have been used to accommodate a miscellaneous collection of curiosities, by no means strictly medical in character. One of these was a dress that had actually belonged to Ivan the Terrible, but it went by the name of 'Joseph's coat'. In 1710 a foreign savant, Uffenbach, who visited the Anatomy School, declared that Hearne, the custodian, 'did not know the cast of a foot from the natural limb.' Hearne was ejected from the post in 1713, not for his ignorance of Anatomy, but for making unseemly jests against the Whigs before a visitor.

At least four of the great Founders of the sixteenth and seventeenth centuries had realized the need of widening education to include such mathematical and scientific studies as were then begin-

ning to be understood. Waynflete established a Praelectorship in Natural Philosophy at Magdalen. The holder received £6 13*s.* 4*d.* a year, and was to lecture free to all comers. By 1664 the lectures were *iam collapsae,* but the visitor ordered them to be restored. In the eighteenth century the Reader gave one lecture a term, which was attended by all members of the college below the rank of M.A.

In 1618 Sir William Sedley founded the Professorship of Natural Philosophy with a stipend of £120 a year. The Professor had the use of the room which now houses the Hope Collection of engraved portraits. In 1524 Thomas Linacre bequeathed estates to found two Medical Lectureships in the University. Tunstall, who was Trustee, assigned them both to Merton, but by the eighteenth century they had become merely sinecures attached to two of the Fellowships, though one, at least, was generally held by a Doctor of Medicine. Merton had early obtained a reputation as a mathematical and scientific college. Sir Henry Savile, its brilliant Warden, had in 1619 founded the Professorships of Astronomy and Geometry which still bear his name. The Professors taught in the two rooms of the middle storey on the east side of the Schools, and the smaller room between them in the Tower of the Five Orders contained the mathematical library which he confided to their care. The top room in the Tower, with the roof above it, was the observatory of the Professor of Astronomy, such as it was in the earliest days of telescopes.

The scientific reputation of Merton gave a peculiar appropriateness to the nomination by Charles I of Harvey as its Warden; but the College did not appreciate the honour, and was delighted to see the last of Harvey, when, after a brief year's rule, the approach of the Parliamentary army frightened him out of Oxford.

Botany, the practical application of which to the culture of useful herbs was easily understood, had been endowed since 1622, when Lord Danby bought the piece of land opposite Magdalen which had been the Jews' cemetery, and, having at considerable expense raised the level to save it from floods and enclosed it with a wall, presented it to the University for a 'Physick Garden', with an endowment for its keeper. The gateway was built from the designs of Inigo Jones. Uffenbach found the garden full of plants, but with few rarities. Some of the best specimens had been intended for the University of Leyden, but had been captured *en route* by a French privateer, and so found their way to Oxford. However, they were restored by the keeper, Jacob Bobart the younger, whom Uffenbach thought more of a gardener than a botanist. In 1707 a rhymester of Queen's described the garden as full of trees cut into fantastic shapes, 'Here frowns a vegetable Hercules', and so forth.

In 1677 and 1682 events took place which were ultimately to be of great importance to science in Oxford. These were the presentation of Elias Ashmole's collection of curiosities, and the building by the University of a Museum for

their accommodation. The greater part of this collection had been put together by two very interesting persons, the John Tradescants, father and son. The elder Tradescant was gardener to several noble Houses, and on the death of the first Duke of Buckingham entered the royal service. He also had a garden of his own at Lambeth, and filled the house attached to it with a zoological collection, consisting chiefly of the skins and bones of vertebrates, so that it came to be called Tradescant's ark. He had visited the north coast of Russia and also Algiers, from which he brought back many new plants, including the apricot. Linnaeus named after him the Spiderwort which he had introduced. Several specimens were obtained from foreign merchants and travellers; others were given him by such exalted benefactors as Charles I and his Queen, the Duke of Buckingham and Archbishop Laud. His son carried on his business, and travelled to Virginia in search of new specimens. He published an account of his collection, called *Museum Tradescantium,* in which appears a 'Dodar (dodo) from the island of Mauritius; it is not able to flie, being so big'. As Tradescant's only son died young, he bequeathed the collections to his friend, Elias Ashmole.

Ashmole was a truly extraordinary personage, even for the seventeenth century. His piquant memoirs show us the struggle between superstition and common sense which still raged about learning. Ashmole tells us that he hung three spiders round his neck to cure himself of ague, and in early life his tastes led him to alchemy,

astrology, and heraldry. As he grew older his interests widened to include every form of antiquarian learning. He added to Tradescant's specimens his own collection of antiques, medals, coins, portraits, some gold chains which had been given him by the Marquis of Brandenburg, MSS. and books on genealogy, heraldry, local and family history, astrology, and alchemy. Then since, as Selden said, he was 'affected to the furtherance of all good learning', he offered the whole to the University (1677), on condition that a building should be erected for its accommodation. The result was the Old Ashmolean Museum in Broad Street, which was the first museum of its kind in England. Many of the less perishable of Tradescant's specimens are still to be seen in the New Museum, amongst them the skulls and bones of the elephant, rhinoceros, and hippopotamus, which must have been very rare in the seventeenth century. Anthony à Wood tells us that the collection filled twelve wagons. His description of the Museum is interesting.

'The building', he said, 'consisted of ten rooms, whereof the principal and largest are public. The upper is the Museum Ashmoleanum, the middle is the School of Natural History, where the Professor of Chemistry, Dr. Plott, reads three times a week. The lower, a cellar, is the Laboratory, furnished with all sorts of furnaces, &c., for use and practice, which is performed by Mr. Christian White, the skilful and dexterous operator of the University, who by the direction of the Professor, shows all sorts of experiments relating to that course, according to the limitation established by the order of the Vice-Chancellor. Near

adjoining the Laboratory, under the same roof, are two faire rooms, whereof one is designed for a Chemical Library, to which several books of that argument have already been presented ; the other is made use of as a storeroom for Chemical preparations, where such as stand in need of them are furnished at easy rates. Near the Museum (under the same roof) is a room fitted for a Library of Natural History and Philosophy. The other remaining rooms are the lodgings, chambers, and studies of the Keeper of the Museum, whereof one, which is most convenient, is sometimes employed for private courses of Anatomy.'

The Keepership was, as its second Keeper, Edward Llwyd, remarked, 'a mean place, seeing there is no salary'; but its first holder, Robert Plot, was a notoriously greedy person. Llwyd accused him of 'as bad morals as ever M.A. had'. But he was a man of wide learning, and witty enough to make his teaching generally attractive. Amongst the many books which he wrote was a *Natural History of Oxfordshire*, and it was he who erected the statue of King Alfred on the gateway of University College. His successor as Keeper of the Ashmolean, Llwyd (1690), had a considerable knowledge of fossils and minerals, of which he presented many specimens to the Museum. He adopted the remarkable course of asking subscriptions for and publishing a syllabus of,—not a book—but a projected tour, to enable him to collect antiquarian and scientific materials. He obtained the money and went on his travels, principally to Wales, though he was ejected from Brittany on suspicion of being a spy : but he disappointed his subscribers by producing nothing

but two treatises on the Celtic language. On his return to Oxford he was appointed to deliver 'six solemn lectures upon Natural History, one every year, for six years'.

The Professorship of Chemistry, of which Anthony à Wood speaks, seems to have lapsed with the retirement of Dr. Plot in 1695, though there were Readers of Chemistry in the eighteenth century. The fair promise of the new Laboratory was not maintained, for in 1710 Uffenbach found it a prey to dirt and disorder, while White, who was still demonstrator, was 'a good-for-nothing man'. In the eighteenth century neither the Keepers of the Ashmolean nor the Readers of Chemistry were men of any reputation. The only exception was Dr. Thomas Beddoes (1788–93), a man of real originality and enthusiasm, who was said to have attracted the largest classes known in the University since the thirteenth century. The Reader was generally a young Doctor, who gave elementary courses for medical students. The Keepership, for which Bradley the Astronomer once tried in vain, was nearly always held by a B.D. In fact, unless bound by such rules as Sir Henry Savile had wisely imposed for the election of his Professors, the University generally appointed some eminent theologian to fill what had become scientific sinecures. In 1755 the learned Non-juring Bishop, Rawlinson, left money to endow the Keepership of the Ashmolean, but with such curious restrictions as to confine the post to men of no distinction. They might not be Doctors in any Faculty, nor Fellows of the

Royal Society, nor of the Society of Antiquarians, for Rawlinson had quarrelled with both these bodies. Besides this, they might not be Irish, Scotch nor Colonial, and they must be unmarried, for Rawlinson appears to have suffered from an unpleasant step-mother.

As far as its contents were concerned, the Ashmolean collection was largely increased during the eighteenth century. Besides the Alfred Jewel, and many antiquarian and anthropological objects, it obtained Martin Lister's valuable collection of shells and fossils, and the Cornish minerals of William Borlase (1758). In 1756 the Countess of Westmoreland gave the great magnet, supporting a weight of 160 lb., which is in the Court of the New Museum. But little care was taken of the more perishable objects, and many fell into complete decay. In 1755 the Vice-Chancellor and Proctors ordered an *auto-da-fè*, which was to include the stuffed dodo. It would have entirely perished, had not an intelligent assistant rescued its skull and claws, which still remain to us.

The Physick Garden had a somewhat happier history than the Ashmolean. In 1728, the Botanist, William Sherard, who was the friend and assistant of Ray, left his library and drawings to the Gardens, and £3,000 to found a Professorship of Botany. He nominated Dillenius as the first Professor, and vested subsequent appointments in the College of Physicians, so that the University could not rejoice in a series of theological Botanists. Dillenius was a German; he wrote several Botanical works and entertained Linnaeus at Oxford.

He was in the habit of scattering strange seeds about in the neighbourhood of the city, some of whose descendants caused surprise to much later generations of Botanical students. From 1747 to 1795 the Chair was occupied by Humphrey and John Sibthorpe, father and son. The elder is said to have delivered only one lecture, and that a failure; but Linnaeus named a genus after him. John, who published a *Flora Oxoniensis*, was a great traveller, but died young.

By far the most noted men of science connected with Oxford in the eighteenth century were those who occupied Savile's Chairs of Astronomy and Geometry, though they did not always fulfil their duties in person. Edmund Halley kept a 24 ft. telescope in his rooms when he was an undergraduate (about 1676), and with it observed a sun-spot. In 1691 he was refused the Savilian Professorship of Astronomy on the ground that he held materialistic views. He denied the charge, but no doubt he had expressed opinions which were free for those days, and Bishop Berkeley called him an 'infidel mathematician'. But in 1703 he was made Professor of Geometry, and still held the post after he was appointed Astronomer Royal, in 1721, till his death in 1742. He was succeeded by Nathaniel Bliss, who himself became Astronomer Royal in 1762. In 1713 John Keill became Savilian Professor of Astronomy. He introduced the teaching of Newtonic Philosophy, but with such caution that the Conservative party never accused him of innovations. In 1741 Keill was succeeded by the great discoverer of

the abberration of light and of nutation, James Bradley. There was at this time no endowment, but the fees of a class which averaged fifty-seven were a sufficient attraction. The lectures were given in the Ashmolean. Bradley succeeded Halley as Astronomer Royal, but continued to spend three months a year in Oxford to lecture. He must, however, have abandoned this practice before his death, since his successor, Thomas Hornsby (1673), had, as an 'instance of reformation' in the University, to give an annual course of lectures.

In 1749, by the terms of Lord Crewe's benefaction, £30 a year was to be paid to a Reader in Experimental Philosophy, and this Readership was for a long time annexed to the Professorship of Astronomy, so that Bradley and Hornsby received this small honorarium. After 1782 Hornsby also held the Sedleian Professorship of Natural Philosophy. He lived to be seventy-seven, and in old age was subject to fainting fits while lecturing. His servant would pick him up and administer restoratives, and he would then proceed with his discourse as if nothing had happened. Hornsby was a pluralist in University appointments; for, from 1772, he was the first Radcliffe Observer, and from 1783 Radcliffe Librarian also.

The mention of Radcliffe turns our attention to new and very important developments in Oxford science. Dr. John Radcliffe was a well-known character of London society in the reigns of William III and Anne. He was by no means a profound student, but wit, skill, and good fortune

had procured for him an enormous practice amongst the wealthy; so productive indeed that, when he lost £5,000, he is said to have remarked that he need only climb two hundred and fifty pairs of stairs to recoup himself. People would sham illness in order to enjoy his witty conversation, but Swift, whom he had attended, called him 'that puppy'. For a long time he was the favourite of the King and Princess Anne; but he offended the former by saying that he 'would not have the King's two legs for his three kingdoms', and the latter by once refusing to wait upon her, declaring that she 'only had the vapours'. He was very generous with his wealth; and, as he had been an Oxford man, and even for a time in practice there, he gave large sums during his lifetime to University College, and at his death (1714), left money to the College to found two Travelling Fellowships. He also placed estates at the disposal of Trustees, out of which were built successively the Radcliffe Library, Infirmary and Observatory.

The 'Physick Library', as it was called, was founded in 1737. It was not at first intended for works on medicine and science only, but after 1809 was kept for this purpose until the building of the New Museum. The Infirmary was opened in 1770. All its physicians had at first to be Doctors of Medicine of Oxford. In 1772 Lord Litchfield founded a Professorship of Clinical Medicine; the Professor was to attend patients and to lecture at the Infirmary. The plan of building the Radcliffe Observatory (begun in 1772)

curiously arose out of the Transit of Venus in 1769. Dr. Hornsby tried to observe it from his primitive premises on the Schools' Tower, and others used the tower of New College and other prominent buildings for the same purpose. So difficult was the observation that Dr. Hornsby seized the opportunity to represent the inconvenience to the Radcliffe Trustees, with the result that the Trustees built the new Observatory and completely fitted it out with the most perfect instruments which could be procured.

One more eighteenth-century benefaction was to have important results for Oxford. In 1755 died Matthew Lee, who had practised medicine in Oxford, bequeathing money to Christ Church to build a School of Anatomy and endow a Readership of £140 a year. The Readership was, however, unfortunately burdened with injurious regulations like the Keepership of the Ashmolean. The School was built in 1767, and is substantially the present Laboratory of the Lee's Reader in Chemistry. It was placed outside the south of Tom Quad, in order that subjects for dissection might be brought in without scandal to the College.

This was the position of Science in Oxford at the beginning of the nineteenth century, when the serious, strenuous, and conscientious movements which changed national life began to be felt in Oxford and led the way to a University Renascence. One of the manifold activities of the new era was a lively curiosity about the works of Nature, which was stimulated by the publication

of Paley's *Natural Theology*, a work of great influence in the Universities. The study of Nature was for a time looked upon as a side branch of Theology, and as very useful for the confutation of the Freethinkers. A manifestation of this feeling was to be observed in the series of 'Bridgewater Treatises', designed to 'justify the ways of God to Man', two of which were written by Oxford Professors. More important for Oxford were new scientific endowments, especially those of Dr. George Aldrich and of the Prince Regent. Aldrich endowed (1803) three Professorships, one of Anatomy, which was annexed to the Regius Professorship of Medicine, one of the Practice of Medicine and one of Chemistry. The stipend of the latter was afterwards increased by a grant of £100 a year from the Prince Regent on behalf of the Crown. The Prince also granted the same sum as an increase to the stipend of the Reader in Experimental Philosophy, and in 1813 and 1818 he founded Readerships in Mineralogy and Geology respectively with stipends of £100 a year each.

In Oxford itself there was a quickened interest in scientific lectures, particularly amongst the senior members of the University, which was fostered by a little group of popular and attractive lecturers, Kidd, Buckland, Rigaud, and Daubeny. A scientific and archaeological society, called the 'Ashmolean', met periodically in the large upper room of that building, and published several volumes of Transactions.

But other causes combined to render this movement superficial and unsatisfactory. The students

of Classics and Theology could not be persuaded to take science seriously. It might be a pleasant recreation, even a hobby, though Dr. Buckland was laughed at for riding his hobby with so much enthusiasm; but to look upon it as the aim of a serious student's life they thought absurd. They could not have conceived of it as a subject worthy of a Final Honour School, and the very suggestion of spending money on proper equipment was scouted. When it proved that after all science was not so meek a handmaid to theology as had been supposed, a bitter opposition began to arise.

Another cause which weakened it was, strangely enough, the first step towards University Reform, the establishment of Final Honour Schools. With the raising of the standard for a Degree in Arts, it became difficult for the ordinary student to pass on to the medical Degrees. The number of Oxford Doctors of Medicine in fact fell off so rapidly that, a few years later, Dr. Daubeny said it would soon be impossible to confine the post of Physician to the Radcliffe to Oxford men. The establishment in 1833 of a regular examination for the M.B. continued this process. In 1837 the *Quarterly Review* stated that there were only about a hundred doctors in England who were Graduates of Oxford and Cambridge. Again, the requirements of the Arts course were now so much more exigent that many men of wide interests, who used to attend scientific lectures voluntarily, were obliged to spend all their energies on subjects which bore directly upon their examinations. Acland complained that 'every reading

man reads for Honours, and his private tutor, if he has tastes for anything but his classics or his mathematics, says, "You will lose your class."' Dr. Daubeny published an interesting analysis of the average number of those attending scientific lectures before and after 1828.

	Before 1828.	*After* 1828.
Chemistry . . .	28	14
Anatomy . . .	29	17
Experimental Philosophy	42	10
Geology	50	30
Mineralogy . . .	30	15

At the beginning of the century the Medical School had been tolerably active. The pressure of the expanding Bodleian had driven the Regius Professor out of the *Schola Vetus Medicinae,* and for a time he was located in the adjoining room, the former School of Rhetoric. From 1801 to 1822, Sir Christopher Pegge was Regius Professor, and was also Lee's Reader in Anatomy. He was a popular lecturer. His first classes were held in the Ashmolean, but later in Christ Church, where he began to form an Anatomical and Physiological collection. His successor was Dr. Kidd, who also held the Aldrichian Professorship of Anatomy. For many years Kidd was a very successful lecturer, and made Christ Church quite a centre of medical study, occasionally even going to the length of procuring a subject for dissection. He also did clinical work before students at the Infirmary. He was a person of wide tastes. He had been the first Aldrichian Professor of Chemis-

try from 1803 to 1822, had lectured and written on Geology and Mineralogy, and added to the Ashmolean collection as well as to that at Christ Church. He was largely instrumental in enacting the new Statute for the M.B. Examination, wrote one of the Bridgewater Treatises, was Librarian of the Radcliffe, and restored the beautiful church and hospital at Ewelme, the Mastership of which belongs to the Regius Professor. Acland described him as 'an admirable man, gifted with a real scientific insight'. Frank and hot-tempered, he hated shams and ceremonies, and was the first Oxford physician to discard the traditional wig, large hat, and gold-headed cane of the profession. Mr. Tuckwell says that he was 'a little man, trotting about the streets in a "spencer", a tailless great-coat then becoming obsolete.' [1] But in later years his teaching powers failed, his audience, once numerous and distinguished, dwindled to three or four pupils, his scientific notions became antiquated, and, in 1844, Dr. C. G. Carus, Physician to the Court of Saxony, declared that the anatomical theatre in Christ Church was reminiscent of the time of Vesalius. Dr. Acland also described it as a 'gloomy, musty room', containing a few anatomical preparations and 'a human skeleton, hanging by its head from an old cord'. It is said that Carus's criticism was the cause of Dr. Kidd's resigning the Lee's Readership, which was followed by the appointment in 1845 of Acland and the opening of a new era in

[1] *Reminiscences of Oxford*, Rev. W. Tuckwell, M.A., 1900.

Oxford science. Kidd no longer taught in the University, but he retained the Regius Professorship and its accompanying offices.

Another well-known medical personage was Dr. Ogle, who was Clinical Professor from 1830 to 1851, when he succeeded Kidd as Regius Professor. He helped in the revision of the medical examinations, and in 1841 published a letter to the Warden of Wadham, 'On the System of examinations as pursued in Oxford, with suggestions for remodelling the Examination Statutes,' in which appeared the first published idea of an Honour School in Natural Science. He also proposed a First Public Examination. In spite of these revolutionary notions, Dr. Ogle was really a cautious, steady-going old gentleman.

The Readers in Chemistry had continued to use the underground room in the Ashmolean for their elementary teaching, and it had now become the home of the new Aldrichian Professor. In 1822 Dr. Kidd was succeeded in this post by Dr. C. G. Daubeny, who holds a place of honour amongst the early nineteenth-century apostles of science. Daubeny had a geniality and enthusiasm which were contagious, and in his underground Laboratory, which he stigmatized as 'notoriously unworthy of a great University, being dark, inconvenient and confined', he gathered an audience which included such men as Pusey, Ruskin, Tait, Whateley, Thomson (of York), Liddell, Church, and Frank Buckland. In 1834 he was appointed to succeed John Sibthorpe as Sherardian Professor of Botany, and with customary energy set to work

at once to improve the Physick Garden and add to its buildings. In 1840 he was appointed Professor of Rural Economy, and he continued to hold all three Professorships till 1854; but such a pluralism can hardly be blamed, for the stipends were very small, and Daubeny did far more than perform the duties expected from any of them. He was as generous as he was enthusiastic, and in 1848 persuaded Magdalen to allow him at his own expense to build a new Chemical Laboratory in the Physick Garden. In his own words he wished that Chemistry should be no longer 'relegated like a sort of occult science or Black Art to underground' rooms, and hoped to 'diminish the objections which may exist in the minds of some against the general prosecution of experimental chemistry within a College by the junior members of the Society'. This building, enlarged in 1902, but still known as the Daubeny Laboratory, contained lecture rooms for Chemistry and Botany and a room to accommodate Daubeny's own considerable collection.[1] Part of Daubeny's chemical apparatus is preserved as a curiosity. It seems very cumbrous and clumsy, and Daubeny was by no means skilful in practical experiments, yet he managed to do some very good work with his old-fashioned tools. Daubeny resigned the Professorship of Chemistry in 1854, in order to devote himself to Botany and Rural Economy, though he continued to teach Chemistry to the Magdalen undergraduates. At his death he left his Laboratory

[1] *A History of the Daubeny Laboratory*, R. T. Günther, 1904.

with its collections and excellent Library to the College.

It was inevitable that stories should be remembered and told of a personality so quaint and attractive as was Daubeny's. Mr. Tuckwell recalls him as 'a little, droll, spectacled, old-fashioned figure, in gilt-buttoned, blue-tailed coat, velvet waistcoat, satin scarf, kid gloves too long in the fingers, a foot of bright bandanna handkerchief invariably hanging out behind'[1]. His portrait is certainly reminiscent of Mr. Pickwick's immortal features. Dr. Vernon Harcourt[2] recalls his assistant, John Harris—himself quite a well-known character—and tells how, when one of Daubeny's experiments did not give the result which he had predicted, he would turn to Harris and say, 'John, when we tried this experiment before the lecture the results were so-and-so.' John assented, and the Professor, turning to his audience, remarked, 'You see, gentlemen.' Another story is told of an occasion when the Professor, holding up a vessel, thrilled his hearers by asserting that it contained a liquefied gas, and that, if he were to drop it, the gas would vaporize, and they would all be immediately suffocated. The next instant the vessel slipped and crashed to the ground, but—nothing happened. 'John, why aren't we all suffocated?' demanded the Professor, and John had to confess that before the lecture he had substituted distilled water for the dangerous gas. Altogether Dr. Daubeny was not,

[1] Tuckwell, *loc. cit.* p. 34.
[2] Address at the Museum Jubilee.

at least in later years, very convincing as a lecturer; and Dr. Vernon Harcourt explains that when, after 1848, undergraduates were obliged to attend two courses of Professors' lectures, Daubeny's were popular, not because of their interest, but because of the shortness of his courses. Professor Storey-Maskelyne remembers that 'they were not inspiring, but conscientious'. Of Daubeny's real services towards the foundation of the Honour School and the building of the Museum we shall speak in the next chapter.

Early in the fifties another, but very modest, Chemical Laboratory made its appearance in two cellars of the new building at Balliol. Henry Smith, the mathematician, was deputed to teach, and so easy was it then for an able man to acquire a comparatively complete knowledge of Chemistry, that Smith learned enough for teaching purposes in a few months. Dr. Vernon Harcourt tells a characteristic story of Henry Smith's lectures. On one occasion a stick of phosphorus took fire on the bench. One pupil was for pouring water over it, which might have caused a dangerous scattering of the fiercely burning liquid. Henry Smith stopped him, and extinguished the blaze by pouring over it a little sand from the sand-bath, remarking in his soft tones, 'Pulveris exigui iactu compressa quiescet.'

From 1810 to 1835 Stephen Peter Rigaud was Professor of Experimental Philosophy; he was also Savilian Professor of Geometry from 1810 to 1827; and from 1827 to 1839 was Radcliffe Observer and Savilian Professor of Astronomy. He was an

accurate, well-read, and hard-working student, and a good controversialist; he greatly improved the instruments in the Observatory. In his time the lecture room for Experimental Philosophy was moved from the Ashmolean to the Clarendon Building. Cardinal Newman is said to have attended Rigaud's lectures in the latter. This, the Physical Department, owing to a benefaction of £85 a year from Lord Leigh, was better supplied with apparatus than the others. In 1839 Rigaud was succeeded as Reader in Experimental Philosophy by Robert Walker, who afterwards took a large share in the founding of the Museum. 'Walker', says Mr. Tuckwell, 'was a cheery person, who gave lively demonstrations with air-guns, magic lanterns, galvanic batteries, and so forth.' Professor Storey-Maskelyne also remembers his lectures as 'popular, i. e. calculated to give some interesting instruction to the undergraduates, who came to them in fair numbers'.

But the man who did more than any other before 1850 to popularize science in Oxford was Dr. Buckland, Canon of Christ Church, and afterwards Dean of Westminster. He was Reader both in Mineralogy and Geology from the founding of these two Chairs (p. 24), and held them until his death in 1856; but in the last years of his life, when incapacitated by illness, his work was done by deputy. Buckland is the typical example of the theologian who took up science as a relaxation. He never considered it the serious business of his life, and yet, in his case at

PLATE II. DR. BUCKLAND LECTURING IN THE ASHMOLEAN

least, it became his chief interest and absorbed the greater part of his energies. He was author of one of the Bridgewater Treatises; but, though himself a most sincere Churchman, he was assailed for heterodoxy because his geological discoveries seemed to controvert the traditional views of the Creation and the Flood. 'Thank God! we shall have no more of this Geology!' ejaculated Dean Gaisford when Buckland went to Italy. But he disregarded the spiteful attacks of his enemies and continued his valuable researches amongst his adored fossils.

Buckland was not only a first-rate original worker, but had also the gift of making his knowledge delightful to others. His lectures were frequented by senior members of the University; his enthusiasm was infectious, and large parties collected for his geological excursions into the country. The descriptions of his quaint *ménage* are well known,—the strange pets, jackal, lizards, and monkey, the extraordinary dishes, crocodile, hedgehog and bear, which appeared at his table, and the rooms crowded with every kind of geological and zoological specimen. Fossils seemed to pervade him, bulging in his great-coat pockets or in the large blue bag which he always carried about with him to receive any lucky find. He lectured at first in a room in the Ashmolean, and a quaint picture, which represents him lecturing on an enormous ammonite, and surrounded by fossils and pupils, is here reproduced. In his biography, written by his daughter, Mrs. Gordon, are quoted some amusing verses on these early lectures by

Shuttleworth (afterwards Warden of New College and Bishop of Chichester).

> In Ashmole's ample dome, with look sedate,
> Midst heads of mammoths, Heads of Houses sate;
> And tutors, close with undergraduates jammed,
> Released from cramming, waited to be crammed.[1]

Professor Storey-Maskelyne recollects that in Buckland's later lectures he brought 'ichthyosauri and other monsters of the past before his class almost to life, "tearing each other in their slime."' This was, of course, long after Buckland left the Ashmolean (1818) for rooms in the Clarendon Building. The upper floor and two attics were allotted to him. The front room facing Broad Street in the western half of the building was the head quarters of Mineralogy, whilst the Geological lectures were given in the parallel room. Here Buckland arranged, as far as he could in such narrow quarters, very valuable collections in his two subjects. Their nucleus consisted of the specimens from the Ashmolean Museum removed thither. This was increased by Sir Christopher Pegge's minerals and fossils, purchased by the University (1828), the minerals given by Sir Richard Simmons (1832), but still more largely by Buckland's own remarkable collections. These he bequeathed to the University, and they were afterwards removed to the New Museum, where a bust of him was also placed.

Buckland was a great loss to Oxford, both

[1] *William Buckland, D.D., F.R.S.*, by Mrs. Gordon, p. 32.

socially and scientifically. His deputy in Geology, H. E. Strickland, was, however, an excellent geologist and an ornithologist; he was one of the earliest martyrs to science, for he was killed by a train while examining a railway cutting for geological purposes (1853). The appointment of his successor, John Phillips, created a precedent, since Phillips was not an Oxford man. Of him we shall hear much later on. Mr. Storey-Maskelyne was Buckland's deputy for Mineralogy, and, after Buckland's death, was himself Reader; the rooms under the Ashmolean which Daubeny had vacated were used by him. Here also he instituted classes in Analytical Chemistry, which were attended, amongst others, by Thomson (of York) and Henry Smith.

Meanwhile the wealth of the University in Natural History collections was augmented by the exertions of the two brothers Duncan, John and Philip, who were successively Keepers of the Ashmolean (1823–9 and 1829–55). Both were enthusiastic and full of generosity. The elder persuaded the Trustees of the Museum to obtain from the University a grant for the repair of the building, and he then fitted up new cabinets at his own expense. Both brothers gave numbers of specimens, John Duncan continuing to contribute after he had resigned the Keepership. An additional room was made over to hold the increased collection, and the whole was re-arranged and catalogued (1836). This Catalogue, by the way, has a quaint wood-cut on the title-page, which shows Tradescant's elephant skulls, the dodo, and

a prim-looking stuffed giraffe, upon which Philip Duncan used to give rides to the little Bucklands on Sunday afternoons. At that date, we learn from this Catalogue, the Museum contained a good collection of Vertebrate animals, but the Invertebrate collection was inferior. There were 1,480 species of British, and 1,656 species of foreign insects in the cabinets. So large a number of the zoological specimens bore the name of John Duncan that he may almost be looked upon as having formed the nucleus of this department in the University Museum.

The light in which science was regarded in the time of the Duncans, and even by these clever men themselves, is very well illustrated by some phrases from the introduction to their Catalogue.

'Happily at this time a taste for the study of Natural History' has 'been excited in the University by Dr. Paley's very interesting work on Natural Theology, and the very popular lectures of Dr. Kidd on Comparative Anatomy and Dr. Buckland on Geology.'

The contents of the Museum were arranged on the following plan.

'The first division proposes to familiarize the eye to those relations of all natural objects which form the basis of the argument in Dr. Paley's Natural Theology; to induce a mental habit of associating natural phenomena with the conviction that they are the *media* of Divine manifestation; and by such association to give proper dignity to every branch of natural science. . . . In the exhibition of animals the order of Cuvier has been generally adopted. The name of every specimen

is conspicuously affixed, and hand-catalogues explain the general principle of the arrangement, and the contents of each cabinet to which they refer.'

Philip Duncan also alludes to the expenses incurred by his brother, but adds, 'I am very sure that he has never regretted that expense, when he considered that it might contribute to the instruction and amusement of the members of an University, for which he always felt the grateful affection and attachment of the most devoted of her sons.'

Natural Science was indeed as yet for 'instruction and amusement', mainly for the latter, it must be owned; for the former so far only as it subserved a theological purpose.

CHAPTER II

THE FOUNDING OF THE MUSEUM AND ITS FOUNDERS

As the nineteenth century advanced, the more enlightened thinkers began to adopt a new point of view about scientific teaching, and to form an ideal of which Sir Henry Acland himself was the most devoted adherent and the best exponent. 'The study of man,' he wrote in his little monograph on the Museum, has been 'viewed apart from all those external circumstances and conditions by which his probation on earth was made by his Maker possible, and through whose agency his life here and preparation for life hereafter were ordained'. To remedy this, Acland desired to give to every student 'a general view of the planet on which he lives, of its constituent parts, and of the relations which it occupies as a world among worlds'.

Acland had no wish to make Oxford a place for training scientific specialists, except for such senior men as should have undergone a previous literary education; he was quite willing, for example, when Lee's Reader, to dispense with human dissections, holding them unsuitable for

his amateur audiences; but he considered that a knowledge of the broad principles of science should be part of the equipment of every educated man. It was an ideal which, whether for good or evil, has never been fulfilled. Acland himself lived to see his hopes disappointed, as scientific specialism was begun at an earlier stage in the student's University career, while all attempts to enforce the smallest modicum of scientific knowledge on the general student were abandoned. But for a time the idea had considerable influence upon Oxford thought.

It was stimulated by the visits of the British Association to Oxford in 1832 and 1847. On the the first occasion Buckland was President, and delivered a famous lecture on the Megatherium. P. B. Duncan was President of the rather comprehensive fourth section, which embraced Geology, Physiology and Botany. There was an opening ceremony in the Sheldonian, evening meetings were held in the Clarendon Building, and Buckland took an excursion geologizing to Shotover. Ladies were not admitted to the meetings, but were allowed to accompany the excursion. But the *Times* oracularly pronounced such assemblies to be useless, and Keble thought them beneath the dignity of the University.

No immediate result appeared from this meeting, but in 1847 the ground had been better ploughed for the sowing of the seed. On this occasion Buckland, Daubeny, Strickland, Ogle, Walker, and Acland all took active parts in its organization and debates. There was much

discussion amongst those present on the condition of scientific study in Oxford, above all on the need of a scientific centre and of proper accommodation for the lecturers, and for the heterogeneous collections scattered about the city in buildings quite unsuited for them. Accordingly, immediately after the meeting, a Memorial signed by Daubeny, Duncan, Acland, and Walker was circulated amongst the members of the University. It ran as follows :—

'We, the undersigned, being officially connected with various institutions for the advancement of Natural Knowledge in this University, are of opinion that the several collections, contained in the Geological Museum in the Clarendon, the Ashmolean Museum, the Anatomical Museum in Christ Church, are deposited in rooms of inadequate dimension and inconvenient arrangement, and that their present efficiency and future progress are by these means retarded.

'Believing that the future welfare of the University is intimately connected with the progress of all her institutions, we are desirous of furthering such steps as may tend to the erection of an edifice within the precincts of the University for the better display of materials illustrative of the facts and laws of the Natural world.

'And in connection with such an edifice we should recommend that there should be one or more lecture-rooms arranged in a manner suited to Demonstrative lectures, and an apartment calculated to serve the purpose of a Library and place for Scientific meetings as occasion may require.

'We earnestly commend this to the consideration of those who are interested in the future welfare of Oxford, and we shall be grateful for their opinions and advice as to future proceedings on this subject.'

The signatories had counted on obtaining Buckland's support, and they must have been greatly disappointed when he replied unfavourably to their request for his signature.

'Some years ago,' he wrote, 'I was sanguine, as you are now, as to the possibility of Natural History making some progress in Oxford, but I have long come to the conclusion that it is utterly hopeless. The idle part of the young men will do nothing, and the studious portion will throw their attention into the channel of honours and profits which can alone be gained by the staple subjects of examinations for Degrees and Fellowships.

'At present it is a detriment to a Candidate for either to have given any portion of his time and attention to objects so alien from what is thought to be the proper business of a University as Natural History in any of its branches.

'I therefore return the paper, which I think it would be useless mockery to put my name to.'

Wanting the sympathy and support of the only Oxford man of science who had any considerable influence either within or without the University, it was impossible at the time to proceed any further in this direction. The memorialists had to resign themselves, as Acland said, to 'work and wait'. Fortunately for the future of science, it had now in Acland a protagonist who had the patience and perseverance, the enthusiasm and unflagging energy, needed for both waiting and working. Great as were the services rendered to the cause by Daubeny, Duncan, and Walker, it is certain that the foundation of the Museum, and to a great extent the establishment of the Honour

School of Science, were in the first place due to his efforts. He possessed a charm of personality, sympathy and unselfishness which disarmed opposition. These qualities are nowhere better illustrated than in the famous story of his relations with Pusey. Shortly after his appointment to the Lee's Readership[1] Acland asked Pusey if it were true that the latter discouraged the study of Natural Science, and Pusey admitted that it was so, since he had noticed that it led to 'a temper of irreverence and often of arrogance inconsistent with a truly Christian character'. 'Then,' said Acland, 'am I to understand that, in proportion as I devote my life with earnestness to discharge the duties to which you, under Providence, have appointed me, I am to be held up as a dangerous and mischievous member of Society?' Pusey, who had a keen sense of humour, laughed heartily, but afterwards said with solemnity, 'The desire to possess such knowledge and the power to attain it are alike the gift of God. They are to be used as such. While you discharge your duties in that spirit you may count on my assistance wherever you need it.' Pusey's promise was afterwards redeemed in no grudging measure, and was destined to have a future result for science which he had probably little contemplated.

Acland was appointed to the Lee's Readership (1847) when he had not even taken his M.D. Degree. This was due to the current notion that

[1] Tuckwell, *loc. cit.* p. 41.

any intelligent man who took an interest in a scientific subject could learn enough in a few months to instruct an ordinary class. The acceptance of such a position was looked upon as an abandonment of ambition, and as only justified by Acland's weak health; and it was not then guessed how he would become both a social and sanitary reformer in Oxford, and also the champion of science. He was determined to redeem the study of medicine from the reproaches of Dr. Carus (p. 27), and he at once devoted himself to accumulating an anatomical collection and arranging it in the Christ Church Laboratory. By 1852 his collection comprised 1,000 osteological specimens, 1,700 physiological specimens, 500 specimens illustrating the anatomy of Invertebrata, and the nucleus of a pathological and histological collection. All these were afterwards passed over to the new Museum. It was a great change from the days of Dr. Kidd and the old skeleton.

These collections landed him in some rather amusing dilemmas. Fourteen cases sent from Edinburgh by sea were detained at the London docks, since the specimens were preserved in whisky which the authorities looked upon as smuggled. Many had to be preserved after reaching Oxford, and Pusey allowed Acland to use his stable for this purpose. Unluckily, Pusey's stable was next to that of another Canon, Dr. Faussett, whose coachman disapproved of the resulting odours, and declared that they injured the horses. Canon Faussett demanded the removal of the offending specimens, but before Acland had had

time to obey, the Canon's servants raided Pusey's stable and flung the preparations into the street. Accordingly the tail of the giraffe now in the Museum is only a plaster cast, the original having been abducted by a passing dog.[1]

Full of enthusiasm for his subject, Acland expanded his lectures into demonstrations which lasted some hours. Dr. Kidd and Dr. Ogle, Church, Charles Marriott, and other Seniors, as well as a few undergraduates and some Oxford medical men, attended them. Dr. Tuckwell amusingly describes the demonstrations, when specimens under microscopes were passed round the class on little railroads. But not quite all the hearers were appreciative. Dr. Kidd, 'after examining some delicate morphological preparation', declared first 'that he did not believe in it, and secondly that if it were true he did not think that God meant us to know it'. These demonstrations were, however, stopped by Lee's Trustees themselves, on the ground that, by the terms of the bequest, only lectures were to be given, and that, as these were not lectures, they must be abandoned.

Acland and his friends were not the men to be rebuffed by the check suffered at their first attempt to improve the condition of science in Oxford. In some respects this check was beneficial to the cause, since it turned their attention to advance in another, though parallel, direction, and led to a reform which, perhaps,

[1] *Henry Acland, A Memoir*, by J. B. Atlay, pp. 123, 145.

properly preceded the erection of a Museum, by providing some students at least to work within it. In 1848 the indefatigable Acland published a pamphlet in the form of a letter to Dr. Jacobson, then Regius Professor of Divinity, in which he urged the duty of 'providing against our graduates leaving the University in utter ignorance of the first principles of those great laws which are imposed on the material world', and of making 'some reasonable use of the foundations we now possess for the furtherance of knowledge of Anatomy, Botany, Chemistry, etc.' In accordance with his strongest convictions Acland declared that 'the real value of the foundations of which I speak arises wholly from the services they perform for general liberal education, and not for detailed professional instruction', and that those who refuse to admit the study of Nature as if it were not sufficiently disciplinary to the mind 'are unconsciously depriving themselves of an engine most powerful for their own object; for of all studies none is more efficient for that object than that of the chief laws of the natural world'.

How ignorant in fact was the ordinary graduate is amusingly illustrated by Dr. Vernon Harcourt's story of the Don who suggested that the Barometer on the walls of the Common Room would fit in better amongst the pictures if it were placed horizontally instead of vertically. There is a similar story of a rather later date which asserts that, during a shower of meteors, two young graduates were heard

betting which of the stars in the Great Bear would fall first.

Acland's remedy was one which, in a modified form at least, was not new to Oxford. Some nine years previously a measure had been discussed for making it compulsory on undergraduates to attend two courses of Professors' lectures before obtaining their Degree. The subject had never been dropped, and Acland enlarged on this proposal. He suggested that every undergraduate should attend courses upon Natural Philosophy, Chemistry, and Physiology, with an examination in each. But his plan would have involved half a day's work every week throughout three academical years, and so great a demand on the student's time was not likely to be conceded. A battle of leaflets and pamphlets was in progress. History repeats itself, and, even in those days, the College Tutors were jealous of their teaching rights, and did not wish to share them with Professors, while the Professors might have declared with justice that it was useless to order them by statute to lecture when they had only empty benches for audience. Dr. Vernon Harcourt says: 'The number of Professors was then multiplying fast, and most of them at least wished to have a class. Osborne Gordon proposed a way out of the difficulty. Every Professor would be required by statute to attend the lectures of each of his colleagues. In this way all would be satisfied and the education given by the Colleges would proceed as before.'

At the same time the proposal for the establishment of new Honour Schools, one of which was to be in Natural Science, had already been made, and was also being vehemently discussed. Among the pamphlets was an excellent brochure by Dr. Daubeny, whose powers as a writer far excelled his success as a lecturer. It was entitled *Brief Remarks on the Correlation of the Natural Sciences*, and contained a syllabus of scientific instruction for the general and special student, the former of whom was to learn something of 'the general laws common to all matter whatsoever — or Natural Philosophy—, the special properties and relations of those bodies which are either most familiar to us, most useful, or most generally diffused throughout Nature—i. e. Chemistry—, and the general laws which govern life, both as it exists in the animal and in the vegetable creation—i. e. general Physiology'. He went on to suggest plans for the Honour School in Natural Science. He laid down the principle that no student should be allowed to specialize in any one branch without showing an elementary knowledge of the primary sciences; but it is curious to note that he would not award such high honours for Chemistry and Physiology as for Physics, Electricity, Geology or Botany. He did, however, declare that Chemistry had now 'soared above that humble level which the traditions of a former age may still assign to it in the minds of the uninitiated, by whom it is often regarded as a kind of Black Art, or is associated with unsavoury reminiscences of the Apothecary's shop'.

Daubeny was, however, opposed to Acland's scheme for enforcing a minimum of science upon all students of the University, and, while demanding attendance at two Professors' courses, would have permitted the students to choose their subjects.

Another writer on the same subject was Robert Walker, the Reader in Experimental Philosophy mentioned above (p. 32). He declared that it was 'discreditable' that any one should finish his education so ignorant as to suppose that 'earth, air, fire and water are the four elements of which the world is composed, and that the communications of the electric telegraph are made by pulling the wires'.

The Professorial trouble was for a time assuaged by requiring from every candidate for a Degree certificates that he had attended two courses of Professors' lectures, a rule which remained in force till 1859. The foundation of the Honour School in 1850 was an event of much greater importance. The first examinations were held in 1853, and, as is not infrequently the case, the new school was very little patronized at its beginning. There were in fact only four successful candidates in the first two years, and, although from 1855 the numbers increased, enemies were inclined to seize upon the paucity of students as an argument against building an expensive Museum on their account.

The want of a centre of organized study in itself militated against the success of the School, but the agitation for a Museum, once begun, had

never been allowed to die down. By letters and personal appeals Acland and his friends were continually pressing on the subject, making converts here and there, and familiarizing the inert mass of University Conservatism with the new idea until it became no longer new, and therefore no longer quite so terrifying. In May, 1849, there was a meeting of about twenty supporters at New College, whose Warden, Dr. Williams, was in favour of the scheme. Resolutions for building a new Museum were passed, and a Committee was formed to decide on the best way of obtaining it. Besides Dr. Williams and Dr. Jacobson, Acland and Daubeny, appear the names of W. F. Donkin, the Savilian Professor of Astronomy, the Rev. Baden Powell, Savilian Professor of Geometry, Manuel Johnson, the Radcliffe Observer, Charles Marriott, A. P. Stanley and W. Thomson (afterwards Archbishop of York). Within a short time the numbers of the Committee rose to sixty, and included Buckland, who had now abandoned his *non possumus* attitude, Bishop Wilberforce, Provost Hawkins of Oriel, Church, Pusey, and even the former antagonist, Dr. Godfrey Faussett. It seemed as if all that was best and most influential in the University was converted to the cause of Science.

The next task was to decide upon what kind of Museum was required. Mr. Storey-Maskelyne collected statistics about the different types of Museum already in existence, with their various methods of lighting and arranging. These were embodied in a little pamphlet which also contained

a list of requirements drawn up by the Professors and Readers. The Reader in Experimental Philosophy (R. Walker) was the most ambitious. He demanded, amongst other rooms, a lecture-theatre capable of holding 250 and a large room for the exhibition of his apparatus and models, of which he believed that 'no institution in the kingdom possesses a more complete and beautiful collection . . . but it is now stowed away in boxes'. He asserted that 'it is not decorous that the Reader should be compelled to wash his hands in the lecture-room itself'.

Dr. Daubeny wanted one Laboratory for the Professor, and another large enough to accommodate twenty pupils; the Professor of Astronomy would be satisfied with a wooden building, costing £50 only; no one but the Lee's Reader seemed to contemplate the possibility of anybody doing research besides the Professor. Altogether there were wanted eight rooms for collections, four lecture-rooms, and only three Laboratories (then called workshops) for the use of students, though each Professor needed a small one for his private use. In this pamphlet Philip Duncan suggested that the Bodleian should give up its books on natural history and receive in exchange those on miscellaneous subjects then in the Ashmolean.

It was at first hoped that a Museum might be erected in part by subscription, the University only to be called upon to supplement private effort, and the Committee accordingly issued an appeal for funds. A rough estimate of the probable cost was obtained from an Oxford architect,

who fixed it at £30,000. On June 19, a meeting was held in the Sheldonian, which was attended by a large number of sympathizers. Nearly £3,000 was soon offered in subscriptions, Mr. Gladstone and Sir Robert Peel each promising £100. But the subscription list never showed signs of providing more than a fraction of the £30,000 required, and in June of the next year (1850) the Committee decided to follow up the impression made by the passing of the new Examination Statute, and to issue a formal appeal to the University, begging it to make its recent recognition of Physical Science effective by supplying it with a proper dwelling and necessary appliances.

Now it happened that the Curators of the University Chest had at that moment nearly £60,000 in hand, the result of profits on the Clarendon Press, and it was some of this money which the Museum Committee hoped to be able to annex for its purpose. A proposal to allocate £53,000 to new Examination Schools, lecture-rooms and a Museum was defeated, partly because of its vagueness. At the same time there arose much active opposition to the Museum scheme, voiced by a pamphleteer who objected to any such application of money derived 'from a very sacred source, the profits upon the privilege of printing God's Word'.[1] But the Museum Committee was far from looking upon this defeat as final, and its hands were strengthened by the recommendation of the University Commission of 1852, 'that the University should proceed with

[1] Atlay, *loc. cit.* p. 203.

the plan lately brought forward, for building a great Museum for all departments of physical science, with proper Laboratories, lecture-rooms and apparatus for lectures. That the Trustees of the present collections of various kinds should be empowered to transfer their collections to this Museum'. Another argument in its favour was the need of a worthy dwelling-place for the splendid entomological collection which Mr. Hope presented to the University in 1849.

The next move made by the Museum Committee was to memorialize the Heads of Houses, and at last, February 17, 1853, the University took the first definite step forward, and appointed a Delegacy to prepare a description of the buildings required, and to submit it to an architect, in order that his report might be presented to Convocation. Amongst the members of the Delegacy were Acland, Walker, Donkin, Strickland, Mr. Greswell, who had offered a subscription of £400, and various Heads of Houses. The Secretary was Mr. Storey-Maskelyne. The meetings seem to have been of a lively nature; the Principal of Brasenose and Mr. Greswell each had a favourite plan of his own, and Mr. Greswell was much annoyed because the Delegacy, as he considered, refused to pay proper attention to his scheme. Mr. Walker insisted on having a lecture-room to himself and not sharing it with the other Professors. Acland wished to begin on a small scale, with a building which should be capable of indefinite enlargement. There was some discussion about the site. Merton had offered to sell a

piece of land in the 'Parks', then consisting of two fields with a path round them, but some delegates objected because of its remoteness from the Colleges,—of course Keble was not then built,—and others because the new buildings would encroach 'on a convenient and healthy walk'. Here again does history repeat itself. But the other site proposed, opposite the Clarendon Building, would have cost £30,000 for the land alone. Acland had at one time hoped to have obtained the use of Merton Fields, and to have surrounded the Museum with an Arboretum and a kind of Zoological garden.

The report of the Delegacy was approved by Convocation, and in December, 1853, four acres of land in the Parks were bought from Merton for £4,000. In January, 1854, a new Delegacy was appointed 'to consider the question of erecting a Museum'. The plan had now been suggested that 'the Museum should consist of a large central court, roofed in with glass, to contain the collections, and surrounded on three sides with lecture-rooms and Laboratories, arranged on two floors, the fourth side being reserved for future additions'. An architect (R. Hawkins) consulted by the Delegacy, reported that £30,000 would cover the expense of such a building, and include out-houses, a Curator's house, and warming apparatus. This report being presented to Convocation, the Delegacy was re-appointed, and decided to offer a competition, with prizes for suitable designs. £30,000 was the limit as to price, and the architects were told that more im-

portance would be attached to convenient internal arrangement than to magnificence of exterior. A sub-committee drew up a pamphlet specifying the requirements of the Delegacy for the guidance of intending competitors. These were very much the same as in the pamphlet of 1849, but with the addition of a lecture-room capable of holding 500 persons. The Zoological department was now to be furnished with a Laboratory, but the Reader in Experimental Philosophy expected only 150 instead of 250 auditors of his lectures. The separate Museums for collections were now all to be combined in the great central court and its corridors. The Chemical Laboratory, and the yard and out-houses belonging to both this and to the Anatomical department were to be detached from the main building.

By October thirty-two designs had been sent in and were exhibited in the gallery of the Radcliffe Library. From these the Delegacy selected six, which they submitted to a firm of architects for criticism. The report was that none of the six could be erected for the price mentioned, but that the one with the motto 'Fiat Iustitia, ruat caelum' came most nearly within the limit. There was some difference of opinion amongst the Delegates as to whether any of the competitors deserved the prizes, since none had complied exactly with the conditions,—even the *Fiat Iustitia* included a basement, the corridors of which had to be lit artificially,—but it was finally decided to award them.

A Sub-Delegacy then examined the plans once

more, and selected two as the most suitable, the *Fiat Iustitia,* which was described as Palladian, and one with the motto 'Nisi Dominus aedificaverit domum',which was Rhenish Gothic. Between these two Convocation was to decide. The Delegacy had already discussed them with some heat. Burgon characterized the western elevation of the *Nisi Dominus* design as 'strange, bizarre and utterly detestable', and so no doubt it appeared to many conservative souls, who could conceive of nothing good but the Gothic of the Colleges and the neo-classical of the Sheldonian. The more conventional design of the *Fiat Iustitia* pleased them better, especially as it involved no unnecessary expense for towers and turrets, though the Radcliffe Observer supposed that these might be useful 'for letting off chemical stinks'. To others it seemed a kind of sacrilege to use Gothic for so secular a purpose, though it was pointed out that the *Nisi Dominus* design was no more ecclesiastical than many continental *Hôtels de Ville.* To the *Fiat Iustitia* it was objected that, since only two-thirds of the whole design were to be erected immediately, it would look very incomplete. To this Burgon replied that in spite of the Commission, he hoped the University would live fifty years to complete it.

Just before the day for the vote there appeared a pamphlet signed ΕΡΓΑΤΗΣ, which has always been attributed to Acland, strongly declaring in favour of the *Nisi Dominus* design. It approved entirely of the convenience of its internal arrangements, of the detached buildings for Chemical,

Zoological and Anatomical purposes, of the handsome arcaded corridors to run round the central hall, and of the fine room occupying 'the whole front on the first floor', intended for the Hope collection, 'for which we are bound in gratitude to provide liberally.' These arguments prevailed with all those who had an open mind on the subject; but there was a large mass of opinion altogether hostile to the scheme, those who opposed science on theological grounds uniting with those who objected to lavishing so large a sum of money on what seemed an unnecessary luxury, since the number of students likely to make use of it appeared so small. Many believed that neither design could be executed for the sum named, and it was of course acknowledged that the £30,000 would only pay for the shell of the building, and that all its necessarily costly fittings would be additional. Some people estimated the total expense at £100,000, in which they were less at fault than, perhaps, they themselves believed. How much more aghast would these economical worthies have been could they have foretold the thousands that an always slightly reluctant University was fated, within the next fifty years, to pour into the rapacious maw of the Science departments.

The pamphleteers were more forcible than accurate. 'Convocation', said one,

'is called upon to commit the University purse into the hands of a set of visionary schemers and theorists. . . . Being unwilling to permit any such Delegacy to play ducks and drakes with our funds, I earnestly call

upon you to attend Convocation to-morrow, and to save *Alma Mater* from taking the dreadful jump in the dark so adroitly laid open for her. . . . We have two Museums as yet unused and unfrequented. . . . Let the Parks be converted into a place of exercise and recreation for Members of the University and other residents amongst us. Is there one shilling at hand to endow this gigantic Babylon? *Non placet* the proposition and we may yet be saved.'[1]

The old-fashioned theologians were even more acrimonious. Though *The Origin of Species* was yet unpublished, Science was to them an irreverent upstart which dared to question the orthodox cosmogony; it must indeed have seemed a sacrilege to spend on it the money earned by printing Bibles. The University Commission had been a pill bitter enough to swallow, but this was worse. W. Sewell, the founder of Radley College, held forth at St. Mary's against the scheme, and one old Don persistently alluded to the Museum as 'the cockatrice's den'.[2]

Had the Tractarian band joined with the other theologians the cause of the Museum must for the time have been lost; but fortunately the old friendship of Pusey for Acland was here of good service. Professor Storey-Maskelyne says that further influence was brought to bear upon Pusey through his brother Philip and Sir Thomas Acland, whose agricultural interests had made them friends. It was Philip Pusey, Professor Storey-Maskelyne also says, who first proposed the plan of a central

[1] Atlay, *loc. cit.* p. 209.
[2] *Ibid.*, p. 210.

court roofed in by iron and glass, the idea having been suggested to him by the new gigantic railway-stations. Hence Pusey and Charles Marriott were already supporters of the Museum scheme, and most of the Tractarians followed them, with the result that it was carried on December 11, 1854, by seventy to sixty-four votes, and the design *Nisi Dominus* was afterwards selected. Its author was found to be Benjamin Woodward, a member of the firm of Deane, Woodward & Deane, of Dublin.

The Delegacy, re-appointed with some additions, found contractors, Messrs. Lucas, who would execute the work for £29,041. Certain alterations were agreed upon between Woodward and the Delegacy, including the simplification of the western elevation, so that 'even Burgon thought it improved'. One of the delegates suggested that the building should be turned round so as to face the south, on which side there was already a good road for approach, while to make a continuation of the road to the northward would add to the expense; but the suggestion was vetoed on account of the arrangements already made for suitable lights in different rooms. There was a fresh outburst of rancour from the enemy before the contract was accepted by Convocation, and great stress was laid on the undoubted fact that the estimate was far below the sum to which the eventual cost of the building, with all its fittings, would amount. However, the majority sensibly concluded that, since it had been settled to have a Museum, the University would now appear

rather undignified if it changed its mind, and the contract was accepted (May 8, 1855).

On June 20 the foundation stone was laid by the Chancellor, Lord Derby, in the presence of a large gathering of University men, townspeople, and visitors. The *Benedicite, omnia opera,* was appropriately included in the accompanying service, the musical part of which was arranged by Sir Frederick Ouseley. Acland composed a special prayer for the occasion, which embodied exactly the attitude of himself and most of his compeers towards science. Parts of it ran as follows :—

'Grant that the building now to be erected on this spot may foster the progress of those sciences which reveal to us the wonders of Thy creative powers. And do Thou, by Thy heavenly grace, cause the knowledge thus imparted to fill us with the apprehension of Thy greatness, Thy wisdom, and Thy love. Dispose' the teachers in this house 'to seek Thy glory, and not their own, in making known the wonders of Thy works. Grant that their knowledge of them may not instil pride, but generate humility, both in the teachers and in the learners.'

After all preliminaries were over and the work was actually in hand, the Museum Delegacy only met occasionally, principally when new expenditure had to be discussed, and the practical business was in the hands of a building Sub-Delegacy. Acland was, of course, one of its members, but the increasing claims of his practice and duties elsewhere rendered his attendance rather uncertain, and, as time passed on, the bulk of the

work, as regards the superintendence of the fabric, came more and more to be managed by the three most active delegates, Walker, Phillips, and Dr. Plumptre, the Master of University. Acland still took the principal part in all that concerned the decoration of the building.

Walker had from the first been most energetic in seconding Acland's efforts. Phillips, who since Buckland's death had been Reader in Geology, was specially useful in the selection of stones to be used for the building and its decoration. He had already obtained experience in the organization of a Museum from his work at York and at Jermyn Street. Professor Boyd Dawkins remembers attending his lectures, still (1858) given in the Clarendon Building, where he was then busy in preparing Buckland's collection for its removal to the new Museum. Professor Boyd Dawkins writes :—

'His important services were recognized by the University in his appointment as its first Curator. In this capacity his cool judgement and unfailing courtesy made him an ideal head for the young Museum, while his great knowledge of Zoology, of Botany, and of Minerals brought him into close touch with his colleagues who lectured on these subjects. He attracted comparatively large audiences, but as might be expected under the conditions then existing but few undergraduates. These, however, he profoundly influenced, and amongst them J. R. Green.'

Three able men of science, all eager to use the new Museum, must be mentioned as new-comers to Oxford in the fifties. In 1855, Dr. (afterwards

Sir Benjamin) Brodie, succeeded Daubeny on the retirement of the latter from the Chair of Chemistry. 'He was', says Professor Storey-Maskelyne, 'a man of refined mind and always original in his views of Chemical problems; a worthy son of his eminent father.' Dr. Vernon Harcourt calls him 'a man of great originality and wide range of interests. He was an indefatigable worker at Chemical problems, and his love of literature, and of poetry in particular, was as great as his love of science. . . . Nor did his devotion to research interfere with his interest in his pupils. He would come round the Laboratory from time to time, and talk or lend a hand to those who were working'. There was no University Laboratory when Brodie came into residence, for the old rooms in the Ashmolean had been given over to Mr. Storey-Maskelyne, and Dr. Daubeny used his own premises at Magdalen. Balliol, however, placed its laboratory (see p. 31) and a lecture-room at Brodie's disposal. But it is small wonder that he was perpetually agitating for the rapid completion and fitting up of his department. He seems to have given the Delegacy some trouble; and, though it declared that 'he cannot have priority over the other Professors', he secured it nevertheless. In 1855 he was demanding £600 for additional accommodation, and in 1858 the Delegacy informed Council that, though £1,650 had been spent on Chemistry fittings, the Professor still required more. Brodie laboured under special difficulties; for he would not sign the Thirty-nine Articles,

and was therefore excluded from pleading his cause personally before Convocation; but he was fortunate in securing Henry Smith's skilful advocacy there.[1] His energy was rewarded, for in 1858 he gave his first course of lectures in the new Museum, though the gas was not yet laid on, the doors and windows were still unpainted, and the central court was unroofed and unpaved.

In 1857, to anticipate events, Mr. Hope offered £200 a year, in addition to the sum already given for the upkeep of his Entomological collection, as a salary for a special keeper, on condition that Mr. J. O. Westwood should be the first holder of the appointment. Mr. Tuckwell says that Westwood was not only an entomologist, but also 'a specialist in the archaeology and palaeography of Art, the highest living authority on fictile ivories and inscribed stones.' He recalls his remarkable power of identifying specimens and his extraordinary skill in the technical work of Entomology, which even went to the length of 'restoring to all its former beauty a beetle which had been accidentally crushed to fragments. Westwood was at first at a disadvantage in Oxford, owing to his humble origin, his Nonconformist opinions, and the difficulty which he experienced in wrestling with the letter 'h', but his 'good-humoured simplicity and unfailing amiability . . . soon won men's hearts, and he became as popular as he deserved to be'.[2]

In 1857 Acland became Regius and Clinical

[1] Dr. Harcourt's Jubilee Address.
[2] Tuckwell, *loc. cit.* p. 56.

Professor of Medicine, and vacated the Lee's Readership, to which was appointed George Rolleston (afterwards Linacre Professor of Physiology, 1860). Dr. Vernon Harcourt says :—

'Dr. Rolleston was an admirable lecturer and teacher, full of knowledge and enthusiasm. He was long one of the chief pillars of Natural Science in the University. His bust, which stands in the court of the Museum, is an excellent portrait. He would sometimes illustrate his lectures on Natural History with apt quotations. For example, in speaking of the pre-eminence of mankind, it was :—

"Pronaque dum spectant animalia cetera terram,
Os homini sublime dedit caelumque tueri."

On the other hand, when he had to tell us that the *hippocampus minor* (a lobe of the brain), on which great hopes had been based, did not serve as a distinguishing feature, it was :—

"Simia quam similis, turpissima bestia, nobis!"'

Professor Tylor [1] describes his immense energy, lively imagination, and unflagging enthusiasm; his lectures, very detailed, vivacious, fluent, discursive, but always illuminating; his eager care of the students working under him, his habit of walking about amongst them, explaining and encouraging. Acland said of him [2] :—

'He was filled with biological conceptions and engaged in biological work of the widest kind. To him Man was the crown of the whole. But Man in his material origin and descent; Man in his evolution,

[1] Biographical Notice to *Scientific Papers and Addresses of Dr. G. Rolleston.*

[2] *Oxford and Modern Medicine*, by Sir H. Acland, p. 27.

social, moral, and intellectual; Man of every time, character, aspiration; Man in his highest relations to his fellow men and to his God. Nothing was amiss to him but meanness and indifference. With boundless sympathy with all that was noble in intellect and morals, he was, when cut off from among us, beginning to inspire the like temper of enthusiasm for science and morality and benevolence in the men that were about him. Unconsciously they drew in the reverent and devout spirit that dominated his eager nature.'

Such were the men who were to help in building and fitting out the new Museum, and to be the earliest teachers within its walls.

CHAPTER III

THE BUILDING OF THE MUSEUM

THE original plan of the Museum building, with such modifications as were introduced while it was in erection, is best described in Acland's own words, taken from a little book which was published by him just before the Museum was finished.[1] The book also contains some interesting letters from Ruskin and Phillips, and was republished with a few additions in 1893.

'The centre of the edifice, which is to contain the collections, consists of a Quadrangle. This large area will be covered with a glass roof, supported on cast-iron columns. . . . The central court is surrounded by an open arcade of two stories. This arcade furnishes ready means of communication between the several departments and their collections in the area. The roof springs from above the upper arcade, so that the arcades on both floors are open to the covered court. . . . Round the arcade is ranged upon three sides the main block of the building. The east is wisely left unencumbered by rooms, to afford ready means of future extension; land has been purchased, which will

[1] *The Oxford Museum*, by H. Acland and J. Ruskin, 1859, pp. 30, 31, 38–40.

admit of such extension whenever it is required. . . . The most complete and largest (department) is that of Chemistry, because the practical work of that extensive subject is likely to be here carried on most extensively. To every department is attached a lecture-room, a private room, and, wherever required, work-rooms and laboratories. Beyond, or outside the main block, to the north, because the coolest side, are an open yard for the anatomical and zoological departments, and, beyond it, dissecting rooms. On the south side are rooms which require special arrangements for experiments or light; a yard for purposes connected with Chemistry and Experimental Physics; and further still, outbuildings, containing work-shops, furnace-rooms, weighing-rooms, and laboratories. Thus all noxious operations are removed from the principal pile, but joined with much convenience to the lecture-rooms, and communicating easily with the central court, common to all departments.

'The laboratory for the chemical students is the large detached building seen at the south-west angle of the Museum. The Abbot's kitchen at Glastonbury will be recognized by you as the prototype. . . .

'On the upper floor are a large lecture-room for 600 persons intended for occasional use; the Entomological collections of Mr. Hope; and, along the front, the library and reading-rooms, together 200 feet in length.'

There was some talk of building the house of the Curator where Keble now stands, and extending the Museum property to Banbury Road, but it was finally decided to place it at the south-east angle of the main building. Its size had, of course, to depend on the status of the person chosen to fill the post of Curator. Burgon suggested that he should be of the same rank as a College Butler, since, if a Professor were appointed,

there would have to be a Sub-Curator, which would much increase the expense. However, the University decided that Phillips should be Curator, and £700 in addition to the original estimate had at once to be voted for his house.

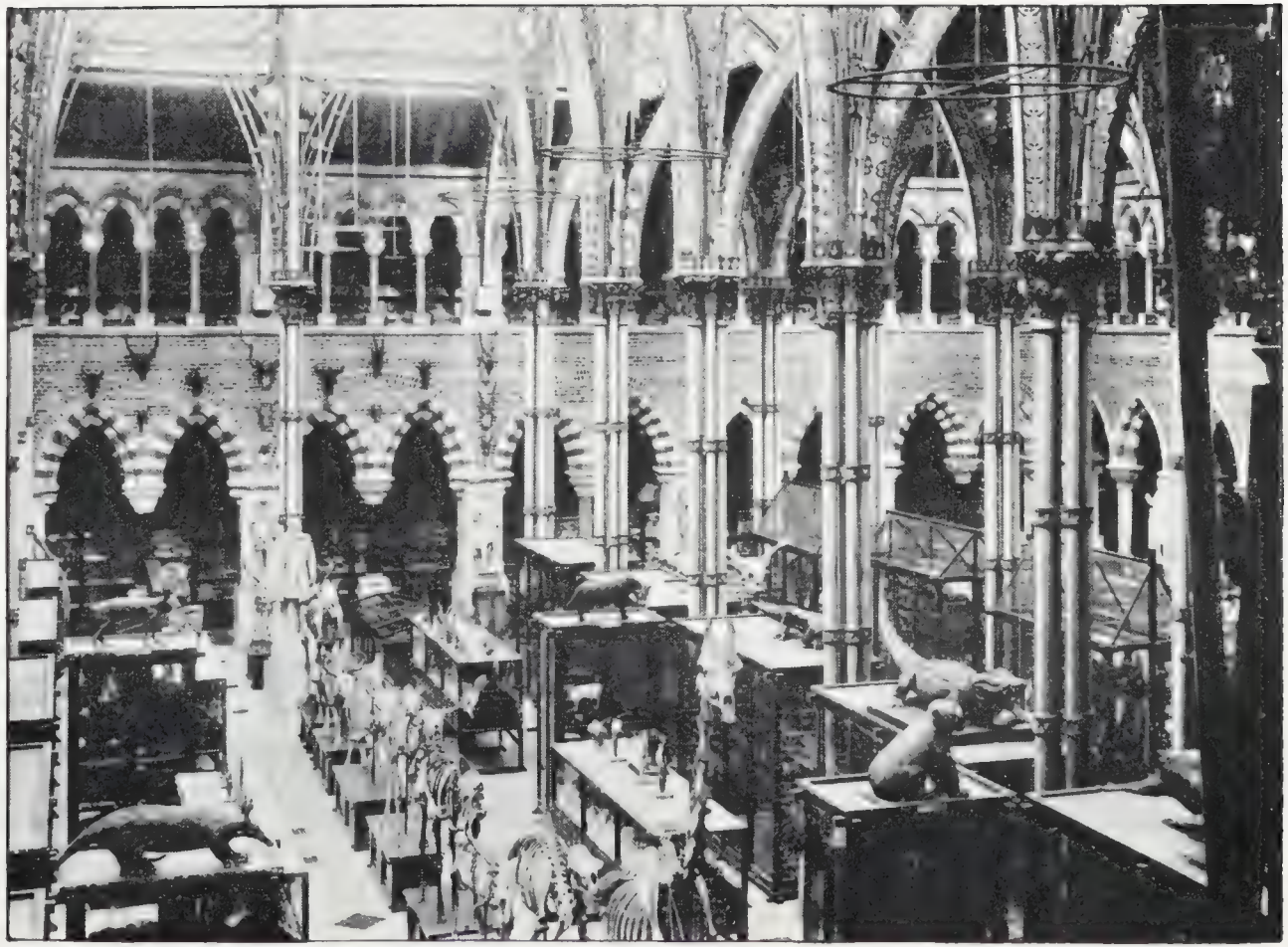
The Delegates by no means found themselves free from their difficulties when the vote for signing Messrs. Lucas's contract was passed and the building begun. As is so often the case when a large piece of work is under the care of a committee, divided responsibility frequently had unbusinesslike results. The architects or contractors would sometimes begin or continue a piece of work on the authority of one delegate only; sometimes they even took the liberty of acting without any authority at all. Then there followed trouble. At last a rule had to be made that no expenditure might be incurred without the signature of the chairman of the sub-delegacy (Dr. Plumptre). Even this rule did not altogether put matters right. For example, Mr. Greswell offered £80 for improvements to the great lecture-room, but withdrew his offer when the University (1859) rescinded the rule compelling undergraduates to attend Professors' lectures, on the ground that the large room was no longer required. But, owing to Dr. Plumptre's absence from Oxford, by the time that Mr. Greswell's decision reached the builders, the proposed alterations had already been made.

There were various minor difficulties; Merton refused to make the new road south of the Museum (South Parks Road), but finally consented to bear

half the expense. The Warden of Wadham (Dr. Symonds) wished to preserve the private nature of the boundary road of the College (Parks Road) by putting up a locked gate, of which the Porter at Wadham was to keep the key !

But all difficulties faded into insignificance beside the greatest, the want of funds, from which the Delegacy always suffered. It may have been wise to place as low an estimate as possible before Convocation in 1853 ; but, since this estimate included nothing but the framework of the building, work had scarcely begun before fresh requirements began to crop up on every side. It was decided that, since the subscriptions promised in 1850 were no longer required for the fabric, the donors should be asked to devote them to decorative work, and fresh subscriptions should be requested for the same purpose, so that no demands should be made upon the University for anything but necessities. But the contract with Messrs. Lucas did not include ventilation, lighting, warming, drainage, water-supply, the enclosing and laying-out of the grounds, not even the paving of the central court, nor oak doors and floors for the principal rooms, nor painting, varnishing and glazing. Besides all these, the various expensive scientific fittings, apparatus, show-cases, and the furniture must all be paid for. The Delegacy, in spite of a message from Council in 1856 that it had better settle once for all what additional sums would be needed, never succeeded in obtaining a definite plan of its requirements, but

PLATE III



THE MUSEUM COURT, LOOKING WEST (1890)

continued to receive at short intervals small estimates from the architects for all the different details. No sooner had these been laid before Convocation than they were found insufficient for their purpose, having generally been cut down in the first place from motives of economy, and fresh demands were made. These were alternated by the presentation of various little bills for work already done, the cost of which had exceeded the estimates. This was the result of the contractors' annoying habit, before mentioned, of continuing their work without the Delegates' authority. Between May, 1856, and June, 1860, no less than fourteen separate grants were asked from Convocation. Of these the most irritating was that of October, 1858, when a deficit of £4,000 was found in the accounts, for expenditure of which only £290 had been authorized by the Delegacy. In May of the same year three heavy grants had been made, one of nearly £3,000 for various purposes, another for the future upkeep of the different departments, and a third of over £2,000 for the iron-work which supported the roof of the central court. This was due to an unfortunate miscalculation on the part of Skidmore, the iron-worker employed by the contractors for this part of the building. He believed that the whole could be constructed of wrought iron, which, he said, 'held out the possibility of uniting artistic iron-work with the present tubular construction, and a prospect of a new feature in the application of iron to Gothic architecture.' This would

have afforded a considerable saving on the contract; but, unluckily, the wrought iron proved unequal to the weight of the glass roof, and the more important parts of it had to be replaced by cast iron, the decorative portions remaining of wrought iron.

The Professors' fittings, especially those required by Dr. Brodie, and the glass cases which were needed for the exhibits, were naturally expensive items; but the requirements of the Professors for the future upkeep of their departments and for assistants (or Demonstrators) and laboratory servants would strike us now as exceedingly moderate. £200 a year was granted for the Mineralogical, Pathological, Zoological, and Geological departments altogether. The Regius Professor of Medicine and the Reader in Experimental Philosophy each wanted a Demonstrator, —a B.A. would suffice—but the Professor of Chemistry wanted two assistants, as well as £800 more for apparatus. The present demands of the Professor of Astronomy were very small; but he outlined a scheme for a future Observatory in the Parks, adding that 'either the Professor or a skilled assistant should reside on the spot'.

The planting out and fencing of the ground caused other difficulties, though trees were given by Sir Thomas Acland, Mr. Sidney Pusey, and the Duke of Marlborough. There was much discussion in the Delegacy as to whether an expensive permanent wall, or a temporary fence should be provided. At last some one satirically suggested that 'in place of the proposed fence, sheep

hurdles should be adopted', and the motion on this was actually put to the vote. The numbers for and against it were equal, but the casting vote was not given.

As for the Curator's house, the extra £700 voted for it proved insufficient; an additional £600 was expended, but it was still without even landlord's fittings, and the Curator was decorating it at his own expense.

The economical and the anti-scientific parties in the University were always on the alert to endeavour by a snap vote to score a victory at the expense of the Museum. Council itself was sometimes unsympathetic. 'Why', it asked, 'should the Professors need gas in their private rooms?' 'Why not carry the drainage into a cess-pool in the grounds instead of going to the expense of providing a long pipe to reach the town main drain?' On several occasions Council cut down the demands of the Delegacy before they reached Convocation. For a long time the laying-down of gas-pipes was delayed, and, when at last Convocation permitted this, it refused to sanction pendants for the illumination of the central court. A vote for oiling and varnishing the window-frames was lost, and they suffered considerably from the heat of the following summer. Another vote for providing a gallery for the Tower on which meteorological observations could be made was also lost.

It is a pleasure to turn from these prosaic and rather depressing details to the really interesting aspect of the Museum building, the architectural

and decorative ideals which it inspired, and how far these were fulfilled. Woodward, the architect, was, as Mr. Tuckwell says, 'a man of rare genius and deep artistic knowledge, beautiful in face and character, but with the shadow of an early death already stealing over him. . . . Every detail of the building was an object-lesson in art, stamped with Woodward's picturesque inventiveness and refinement.' When he came to Oxford, he was still actually engaged in building the new library of Trinity College, Dublin. He was of the same artistic character as the Pre-Raphaelites, and was thoroughly in sympathy with their traditions and principles. He was also much under the influence of Ruskin, and had accordingly built this library after the type of a Venetian or Veronese palace, while the decorations were designed by the workmen themselves, and represented foliage treated very unconventionally. While in Oxford, Morris and Burne-Jones fell much under Woodward's influence, and he became the architect of the Library at the Union which the Pre-Raphaelites decorated. He had indeed asked Rossetti to make designs for the Museum decoration, but the plan came to nothing. Woodward's death from consumption in 1861 was a cause of great sorrow to all lovers of art in Oxford, and especially to all those who had worked with him at the Museum.

Woodward was a man possessed with the sense of a mystic meaning underlying nature and art, devoutly eager to use his artistic powers in the service of truth and righteousness, full of love

for nature in all its forms simply as nature, yet always ready to find a symbolism in nature which should give a purpose and meaning to his creations. Like the mediaevalist that he was, he delighted in lavishing details of simple beauty, the unconventionalized ornament of real natural forms in every part of his work, yet no detail was too simple not to be subordinated to, and linked into harmony with, the ordered whole of his design. He threw himself heart and soul into his task. Acland tells us that he wrote no less than ten letters in his own hand about one window to the workman who was carving it. So great was his enthusiasm that he was always eager to outrun the orders of his employers, and on at least one occasion offered to take the risk himself should Convocation refuse to pay for the work done by his orders.

To such a man Gothic was of course the natural atmosphere, and the Museum was the opportunity which he desired for reviving the Gothic ideal for secular purposes. Acland was completely converted, and was one of its 'warmest advocates'; 'the malleability, which is', he wrote,[1] 'perhaps the highest prerogative of Gothic art,' made it, as he thought, particularly suited for the purpose in hand.

But Woodward had a greater than Acland to back him, no less a man than the prophet of the Gothic, Ruskin himself, who had been delighted when the *Nisi Dominus* design was chosen. Soon

[1] See *The Oxford Museum*, loc. cit., for this and subsequent quotations.

he came to Oxford to admire, suggest, encourage, and contribute liberally, and at the same time to form a friendship with Acland, which even a vital difference in later years could not break. Mr. Atlay says, 'Ruskin was allowed . . . to rear one of the brick columns, and Acland used to show it with great pride to visitors at the Museum; legend relates that the workmen found it necessary to demolish the column and reconstruct it by less eminent hands.'

Ruskin's views on the architectural style of the Museum and its connexion with the revival of Gothic are given at length in two letters written by him to Acland in 1859, and published in Acland's book on the Museum. He agreed with Acland about the malleability of Gothic; its 'essence and power', he wrote, 'lay in its adaptability to all need; in that perfect and unlimited flexibility which would enable the architect to provide all that was required in the simplest and most convenient way; and to give you the best offices, the best lecture-rooms, laboratories, and museums, which could be provided with the sum of money at his disposal.' 'So far', he continued, 'as you find yourself in anywise inconvenienced by forms of architecture; so far as pillars and piers come in your way, when you have to point, or vaults in the way of your voice, when you have to speak, or mullions in the way of your light, when you want to see;—just so far the architect has failed in expressing his own principles, or those of pure Gothic art.' Alluding to the adverse feeling about the architecture

PLATE IV

ACLAND AND RUSKIN

which was still strong in the University, he said, 'The general idea has perhaps been, hitherto, that it is a forced endeavour to bring decorative forms of architecture into uncongenial uses, whereas the real fact is that no other architecture would, under the required circumstances, have been possible.' It was perhaps for Ruskin's peace of mind that he never saw the new Pathological department, which a more practical but less idealistic generation considers the most suitable type of building for a laboratory.

Yet Ruskin was himself dissatified with the general effect of the building.

'As it stands,' he wrote, 'there is a discouraging aspect of parsimony about it. One sees that the architect has done the utmost he could with the means at his disposal, and that just at the point of reaching what was right, he had been stopped for want of funds. This is visible in almost every stone of the edifice. It separates it with broad distinctiveness from all other buildings of the University. It may be seen at once that our other public institutions and all our Colleges—though some of them are simply designed—are yet richly built, never pinchingly.'

Ruskin, it must be remembered, was writing in 1859. It was this poverty-stricken appearance which the Museum builders hoped to remedy by lavishing beautiful ornament wherever it was possible, thus hiding the parsimony of the University under the generosity of private benefactors.

Subscriptions at first came in plentifully. Many of those already promised for the building were

now devoted to its decorations, and other generous donors gave statues, marble pillars, and money. The interest of the Prince Consort in matters scientific and artistic led to a gift from the Queen of five statues (Bacon, Newton, Galileo, Leibnitz, and Hunter), to which in later years was added one of the Prince himself. Other statues were given by the Bachelors of Arts and Undergraduates (Aristotle), by John Ruskin, sen. (Hippocrates), by Mr. Hope (Linnaeus), and by Mr. M. P. W. Boulton (Watt). Donors of £100 were Lord Derby, Sir Robert Inglis, Mr. Gladstone, and Mr. T. G. B. Estcourt, while Ruskin himself gave £300, which he wished to be devoted to the decoration of the windows and doorway. Thomas Combe gave £70, and Sir W. Trevelyan £50.

It was from the first the desire of Ruskin, Woodward, and Acland that no conventional or meaningless ornament should, for the sake of merely decorative effect, find a place in the Museum. Ruskin wrote:

'The second great principle of the Gothic revivalists is that all art employed in decoration should be informative, conveying truthful statements about natural facts, if it conveys any statement. . . . If it represents organic form, it will give that form truthfully, with as much resemblance to nature as the necessary treatment of the piece of ornament in question will admit of.' And Acland wrote, 'Let us carve one capital as well as we can, though that be feebly . . . rather than varnish the whole surface with endless design, which is too coarse to be an imitation of natural objects, and too mean and too often repeated, to be counted within the range of art.'

Hence their plan was that the decoration should portray or typify that very natural history for the study of which the building was intended. The columns in both arcades were to be in themselves a lesson in geology, since they were to be composed of as many different varieties of British stones as could be obtained. The porch was to show an imaginative design symbolizing some aspect of science. The statues were to represent the great pioneers of scientific study. The capitals, corbels, and bases of the columns, the spandrels of the roof, and the external carving of the windows were to present a complete series of Fauna and Flora, the examples being as far as possible British. Ruskin pointed to Melrose Abbey as the mediaeval example of this kind of decoration, and quoted Scott's descriptive verses:

> 'Spreading herbs and flowerets bright
> Glistened with the dew of night.
> No herb nor floweret glistened there
> But was carved in the cloister arches as fair.'

'Your Museum at Oxford', he added, 'is literally the first building raised in England since the fifteenth century which has fearlessly put to new trial this old faith in nature.'

Ruskin propounded another canon of Gothic art, as he conceived it, which was faithfully observed in the work on the Museum.

'All architectural ornament', he wrote, 'should be executed by the men who design it,' and should excite 'the intelligent co-operation of various classes of workmen'.

He owned, however, that this principle exposed it

'to chances of occasional failure, such as would not have attended the adoption of an established mode of modern work.' . . . It is not possible 'to summon into service the various phases of human temper and intelligence, without occasionally finding the tempers rough and the intelligence feeble. The Oxford Museum is, I believe, the first building in this country which has had its ornamentation, in any telling parts, trusted to the invention of the workman; the result is highly satisfactory, the projecting windows of the staircases being as beautiful as anything I know in civil Gothic; but far more may be accomplished for the building if the completion of its carving be not hastened; many men of high artistic power might be brought to take an interest in it, and various lessons and suggestions given to the workmen, which would materially advantage the final decoration of leading features. No very great Gothic building, so far as I know, was ever yet completed without some of this wise deliberation and fruitful patience.'

It was possible to put this theory into practice because Woodward had, during his work at Dublin, discovered several Irish workmen, whose originality of imagination and practical skill enabled them to carry it out, while they were simple enough to be content with the humble £2 a week of the English mechanical sculptor. These men the architect brought over with him, and they found welcome and kind treatment from the Delegates. A temporary mess-room and reading-room, with a kitchen and cook, were provided for the workmen in the Parks, so that many of the strangers only slept in the town.

PLATE V

ONE OF THE EARLY CAPITALS (IVY)

Books, popular lectures, and morning prayers were also arranged for them, and they seem thoroughly to have appreciated the kindly feeling of their employers.

Pre-eminent amongst them were the brothers John and James O'Shea, to whose racy genius the best carving in the Museum was due. They would go off to the Botanical Gardens, choose a fine specimen of a plant, according to the grouping selected by Professor Phillips, and, taking it back to their scaffolding, they would copy its living form on capital or window-arch with extraordinary vivacity and sympathetic comprehension. The carvings in the upper west gallery, which were by another workman, named Whelan, are obviously inferior to those in the lower corridor which O'Shea executed. The work of the O'Sheas, said Acland, 'often as beautiful in design as in execution, would occasionally be as grotesque as the typical gargoyle. Art and humour were inborn in them.' They were not always appreciated by persons who

'had more architectural learning than humour or mediaeval instinct. . . . The lower windows on the south of the west front were to illustrate the vertebrate classes: *Man, Quadrumana, Carnivora.* The second window was first begun by order of the architect, but probably not by that of the Delegates, it being Long Vacation.

'O'Shea rushed into my house one afternoon, and—in a state of wild excitement—related as follows: "The Master of the University" (Dr. Plumptre, secretary to the sub-delegacy) "found me on my scaffold just now. 'What are you doing?' says he. 'Monkeys,' said I.

'Come down directly,' says he, 'you shall not destroy the property of the University.' 'I work as Mr. Woodward orders me.' 'Come down directly,' says he, 'come down.'" "What shall I do?" says O'Shea to me. "I don't know; Mr. Woodward told you monkeys; the Master tells you no monkeys; I don't know what you are to do." He instantly rushed out as he came, without another word.

'The next day I went to see what had happened. O'Shea was hammering furiously at the window. "What are you at?" said I. "Cats," said he. "The Master came along, and says: 'You are doing monkeys, when I told you not.' 'To-day it's cats,' says I. The Master was terrified and went away." It did not, however, so end; O'Shea was dismissed. I went to bid him good-bye with mixed and perplexed feelings.

'I found O'Shea on a single ladder in the porch wielding heavy blows such as one imagines the genius of Michael Angelo might have struck when he was first blocking out the design of some immortal work. "What are you doing, O'Shea? I thought you were gone, and Mr. Woodward has given no design for the long moulding in the hard green stone." Striking on still, O'Shea shouted, "Parrhots and Owwls! Parrhots and Owwls! Members of Convocation!" There they were, blocked out alternately. What could I do? "Well," I said, meditatively, "O'Shea, you must knock their heads off." "Never," says he. "Directly," said I.

'Their heads went. Their bodies, not yet evolved, remain to testify to the humour, the force, the woes, the troubles in the character and art of our Irish brethren—much to love—much to direct—much to lament.'

They are still to be seen in the archway of the outer door; but it is pleasant to be able to relate

[1] *The Oxford Museum*, ed. 1893, p. 107.

PLATE VI

O'SHEA CARVING A WINDOW

that O'Shea was recalled, and in 1860 was working again on the windows.

The chequered history of the ironwork which supports the roof has already been told (p. 69), but it was completed at last.

'The wrought-iron ornaments represent,' wrote Acland, 'in the large spandrels that occupy the interspaces between the arches of the principal aisles, large interwoven branches, with leaf, and fruit, and flower, of lime, chestnut, sycamore, walnut, palm, and other trees and shrubs, of native or of exotic growth; and in the various parts of the lesser decorations, in the capitals, and nestled in the trefoils of the girders, leaves of elm, briar, water-lily, passion-flower, ivy, holly, and many others.'

The work was an experiment; and, to critics accustomed to the high measure of beauty which modern ironwork has reached, seems to have fallen far short of perfection. This is partly due to the unpleasant tints with which it has been painted; though, if a suggestion which was made at the time of imitating the natural colouring had been carried out, the results must have been far more tragic. Ruskin himself was not wholly pleased. He wrote:—

'In one spandrel, for instance, the horse-chestnut leaf and nut are used as the principal elements of form; they are not ill-arranged, and produce a more agreeable effect than convolutions of the iron could have given, unhelped by any reference to natural objects. Nevertheless, I do not call it an absolutely good design; for it would have been possible, with far severer treatment of the iron bars, and stronger constructive arrangement

of them, to have given expression, not of the shapes of leaves and nuts only, but of their peculiar radiant or fanned expansion, and other conditions of group and growth in the tree.'

Another scheme, which was, fortunately perhaps, not executed, was to cover the wall-space between the two arcades with frescoes. Sir Walter Trevelyan feared lest the carving on the capitals might distract students from their research. There would have been reason for such a fear if the wall had been painted with struggling figures of men and horses, like those depicted in a rough sketch which is still extant.

The most complete and successful part of the decoration was the series of columns, of which Professor Phillips himself composed a description at the end of Acland's book.

'In the arrangement', he wrote, 'of the many valuable and curious examples of polishable stones . . . we have desired to employ so much of system as to make these ornamental parts of the fabric really and obviously useful, as parts of the exhibition of natural objects. Regarding the rocks as of aqueous or igneous origin, and of unequal geological date, we wished to exhibit these relations in our building, by giving to each group an appropriate place. It was found, after great efforts, possible to accomplish this to a considerable extent, but not quite so perfectly as was hoped.'

In the lower arcade, on the west side are 'six fine examples of granite and its twin brother syenite. On the north you see eight shafts, all from Ireland or Devonshire, all belonging to palaeozoic, stratified, or metamorphic rocks'. On the east are 'a second set of igneous and metamorphic rocks, to face the old granites

and porphyries. On the south, you have a beautiful and pretty well known series of English and Welsh marbles, mostly of the carboniferous limestone, but including what are less commonly seen, the breccia of Mendip and the gypsum of Chellaston'. The whole upper corridor on the west side is 'occupied by granite, porphyry, serpentine, &c. . . . The upper north corridor is wholly filled with marbles from the carboniferous limestone and older rocks of Ireland, including the serpentine of Galway. . . . On the western side the series of shafts is varied. . . . At the extremities we have, from Nottinghamshire, Derbyshire, and Somersetshire, specimens of the Permian limestones, triassic breccia and gypsum, in the centre are granites of Jersey and Cornwall—flanked by columns of slate and shafts of lias, blue and white; marbles of Purbeck, Stamford and Buckingham.' . . . 'Lastly, on the south side, is a series of the finest rocks belonging to the carboniferous and Devonian limestones of England and Wales, including the crinoidal marble of Dent (the birthplace of Sedgwick, who gives the shaft).'

The statues were placed on corbels, projecting from the lower piers. 'The unselfish zeal of two first-rate sculptors, Mr. Munro and Mr. Woolner,' wrote Ruskin, 'has already given you a series of noble statues.' It was at first proposed that they should be life-sized, and, considering how near they are to the spectator, it is perhaps to be regretted that the idea was abandoned. Besides those already mentioned (p. 76), there were also erected statues of Harvey, Priestley, Stephenson, and Davy. In later years, Sydenham and Darwin and a plaster model of Oersted have been added, and there are also, ranged by the statues, busts of Sir John Burdon-Sanderson, Henry Smith,

Sir Joseph Prestwich, William Smith, Phillips, Buckland, Rolleston, Weldon, and Acland himself, as well as a medallion of Woodward by Monro.

The porch was from the first a subject of much discussion amongst the delegates. It was generally recognized that a projecting porch with sculpture would greatly improve the general exterior appearance of the building. 'The proposal', wrote Ruskin, 'appeared to me every way full of advantage, the blankness of the façade having been, to my mind, from the first, a serious fault in the design. If a subscription were opened for the purpose of erecting one, I should think there were few persons interested in modern art who would not be glad to join in forwarding such an object.' He was also anxious that this porch should be enriched with portrait-statues. Unluckily, though Mr. Greswell offered £200 towards it, sufficient persons 'interested in modern art' were not found to subscribe, and the plan was abandoned in favour of a scheme for relief carvings on some blocks of marble above the flat archway. Pollen executed a beautiful design, and Woolner, says Mr. Atlay, 'carved without remuneration over the arch and in the spandrels some very delicate work' which is 'only part completed'. A manuscript note among Acland's papers states that 'the idea contained in the bas-relief is that of evolution, spiritual and material; it takes the received origin of Man as the basis of the thought. On the left-hand side is the first man, Adam, in a state of innocence, holding

back the bloodhound, the emblem of suffering and death. At the base on the right, Eve is attentively listening to the voice of the tempter, still undecided. From these two ascend flowers and thorns and fruit. These reach to the top of the arch, on which rests the Angel of Life, bearing in one hand an open book, the emblem of intellectual and spiritual life, in the other the dividing nucleated cell, the type of all material function, growth, and decay.'

Failure of subscriptions arrested the greater part of the work of decoration. The carving of the porch and façade windows is in a very fragmentary state. Some of the latter are elaborately finished, some half-done, some not even begun. The series of columns was fortunately completed, but barely half the number of statues contemplated were erected, and after thirty capitals on the ground-floor and sixteen upstairs were carved, the work was abandoned, the remaining eighty being left as rough blocks, as were also the corbels and string-course of the upper arcade.

The generosity of the Rev. H. T. Morgan, of St. Margaret's, Lincoln, who as an undergraduate, watched O'Shea at work, has lately in part supplied the defect. He offered (1905) to pay for the completion of the carvings in the upper west corridor, and for the whole of the upper south corridor. Messrs. Mills and Holt, two skilled sculptors in the employ of Messrs. Farmer & Brindley, were sent down to undertake the work; and they have executed it with such a delicate precision and wealth of imaginative power, that

their beautiful plant-portraits rival, or even excel, those of O'Shea in the court below.[1] The shade of Ruskin, gazing upon these, might well be appeased for architectural monstrosities near by which would pain him.

It seemed unfortunate that the rest of the carvings should not be completed at so excellent an opportunity, and Professor Miers, then Curator of the Museum, issued an appeal for subscriptions, with the result that enough money was forthcoming for Messrs. Mills and Holt to continue their work. The whole of the east arcade, with the exception of its string-course, has been finished, and the capitals of the north arcade are now being worked upon, but further subscriptions are still required for their completion. It is to be hoped that the time may not be long distant when the carving of this arcade, and perhaps of the windows and doorway also, will set a seal on the beautiful work of Woodward, Woolner, and the O'Sheas, and bring it nearer to the ideal which Ruskin pointed out at the end of his letter.

'I cannot close this letter', he wrote, 'without pointing it out, and warning the general reader against supposing that the ornamentation of the Museum is, or can be as yet, a representation of what Gothic work will be, when its revival is complete. Far more severe, yet more perfect and lovely, that work will involve, under sterner conventional restraint, the expression not only of natural form, but of all vital and noble

[1] Those done by these sculptors in the west corridor are the capitals and bases of columns Nos. 37–43, and of the piers between them.

ONE OF THE LATER CAPITALS (CANTERBURY BELL)

natural law. Yet,' he added, 'although I doubt not that lovelier and juster expressions of the Gothic principle will be ultimately arrived at by us, than any which are possible in the Oxford Museum, its builders will never lose their claim to our chief gratitude, as the first guides in the right direction; and the building itself . . . will only be the more venerated the more it is excelled.'

CHAPTER IV

THE MUSEUM SINCE ITS FOUNDATION

The fabric of the Museum was practically completed in 1860, and the departments were used for the sectional meetings of the British Association which was held at Oxford in that year. The famous controversy between Huxley and the Bishop of Oxford concerning the Darwinian theory of the Origin of Species took place at a meeting held in the large room which was afterwards fitted up as the Radcliffe Library. To quote Mr. Tuckwell, Wilberforce

'plagiarized from a mountebank sermon by Burgon, expressing the "disquietude" he should feel were a "venerable ape" to be shown to him as his ancestress in the Zoo: a piece of clever, diverting, unworthy claptrap. Huxley rose, white with anger. "I should be sorry to demolish so eminent a prelate, but for myself I would rather be descended from an ape than from a divine who employs authority to stifle truth."... "I am asked", Huxley went on, "if I accept Mr. Darwin's book as a complete causal hypothesis. Belated on a roadless common in a dark night, if a lantern were offered to me, should I refuse it because it shed imperfect light? I think not—I think not."'

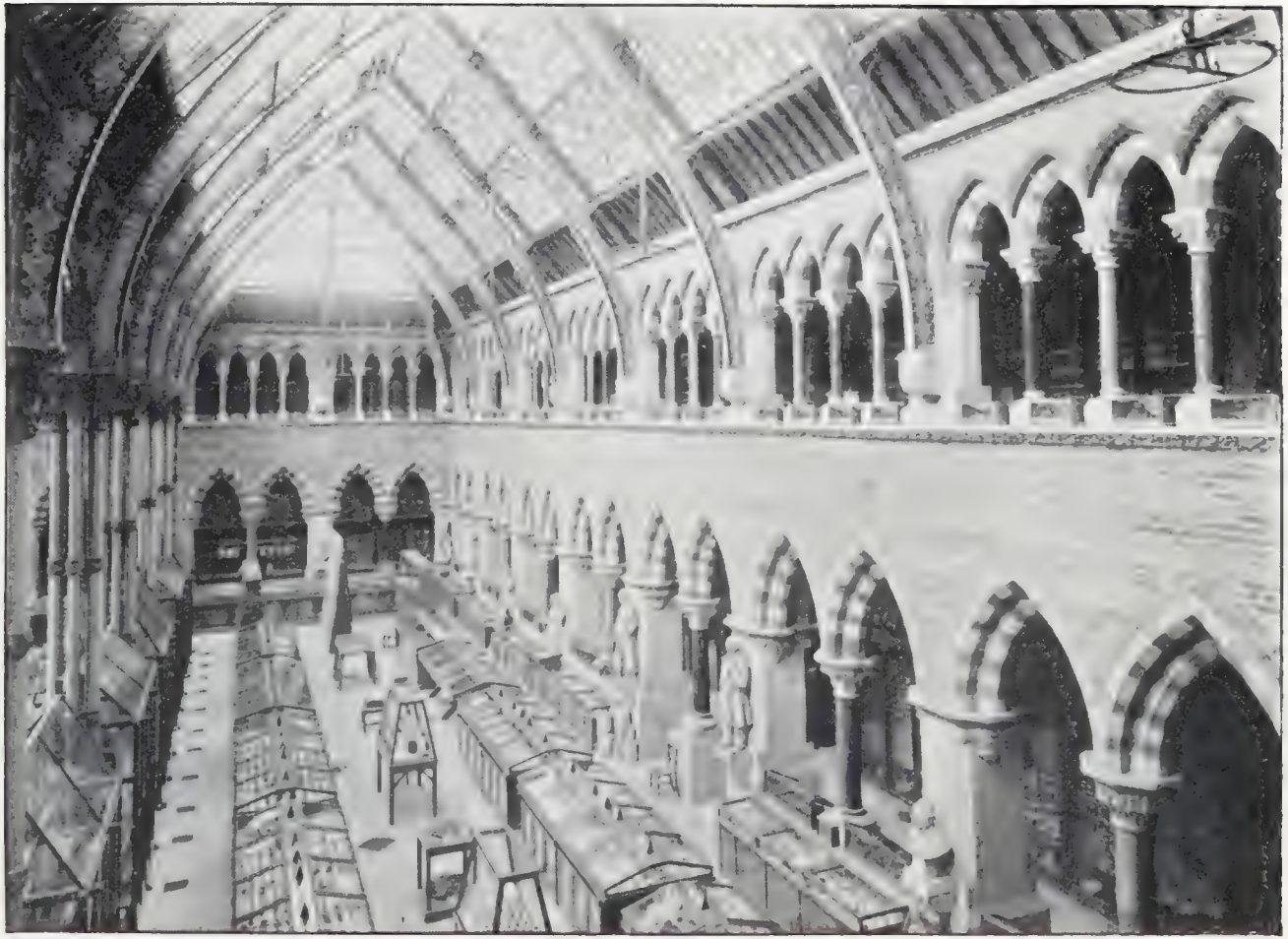
The Radcliffe Library room had been originally assigned to the Hope Entomological collection, but largely at Acland's instance it was retained for the scientific books which Radcliffe's trustees had been accumulating for a century past, and which had been housed in the Radcliffe Camera. Clearly it would be much more useful to have the library in the Museum itself, in the centre of the scientific departments, and accordingly it was transferred together with its librarians, whilst the Bodleian Library and the University in general reaped the benefit of a convenient reading-room and place for storage. Thanks to the generosity of the Radcliffe trustees, it has been possible to keep the library in a high state of efficiency. At the present day it takes in about 600 scientific periodicals, in addition to purchasing numerous text-books and monographs embracing all scientific subjects, with the partial exception of Botany, which has a special library of its own at the Botanic Gardens. Ample as was the original accommodation, the accumulation of books became so rapid that after forty years it proved insufficient, and in 1903 the whole of the library was transferred to a fine new building which had been erected at the south-west angle of the Museum at the expense of the worshipful Company of Drapers. To this body Oxford is indebted for another munificent gift in the Electrical Laboratory now in course of construction.

Though structurally complete in 1860, the Museum was not finished internally for several years to come. However, the departments were in

working order from the beginning of 1861. The main subject studied in these early years by most science students was Chemistry, and Professor Brodie gave regular courses of formal and of catechetical lectures, whilst his laboratory was open daily for practical instruction in analysis. The Professor of Experimental Philosophy, or his deputy, also gave practical instruction, and Dr. Rolleston, the Linacre Professor of Physiology, had regular classes for practical work two days a week, which were attended by about twenty students. From 1864 onwards the Savilian Professor of Astronomy (W. F. Donkin) also gave practical instruction, but none was given by the Professors of Geology, Mineralogy or Botany. In fact, the practical study of scientific subjects was not generally regarded as so important as attendance at lectures, coupled with the inspection of apparatus and collections: but it gradually evolved by almost imperceptible steps to the present-day method, in which the student, whatever science he be studying, devotes several hours each day to acquiring a first-hand knowledge of his subject by direct experimental investigation. This entails the use of a large stock of apparatus, frequently very costly, and hence the expense of the maintenance of the Museum and its departments is necessarily a large one, and a serious drain upon the resources of the University.

By 1867 the total outlay upon ground, buildings, and maintenance of the Museum was over £87,000, and since that time every few years has seen the erection of additional blocks of buildings,

PLATE VIII



AISLE OF THE MUSEUM COURT, LOOKING SOUTH-WEST (1909)

till the present Museum is about twice the size of the original. The first considerable addition was made in 1870, when the present Clarendon Laboratory at the north-west angle of the Museum grounds was built. This was occupied by Professor Clifton, the Professor of Experimental Philosophy, who happily still remains with us, the senior Professor of the University. He teaches chiefly the subjects of Sound, Light, Heat, and Hydrostatics, whilst Electricity and Magnetism are taught by the Wykeham Professor of Physics (Professor J. S. E. Townsend), in the room lately used for the Radcliffe Library, which in 1903 was structurally altered for this purpose.

The small rooms on either side of the present Chemistry lecture theatre, previously occupied by the Professor of Experimental Philosophy, were assigned to Professor Brodie for the use of his department. In spite of this small addition, however, the accommodation in the Chemical department soon proved to be insufficient for its growing needs, and in 1877 a large new block of buildings at the south-east angle of the Museum was begun. This was finished in 1879, and consists of an upper large room, used chiefly for teaching elementary Inorganic Chemistry, and a ground floor, broken up into several rooms, used for the teaching of Organic Chemistry. A further small addition was made to the buildings of the Chemistry department in 1901, consisting of an extra laboratory built over the small rooms at the side of the corridor. The large chemical room, built at the foundation of the Museum in imita-

tion of the kitchen at Glastonbury Abbey, proved an unfortunate sacrifice of utility and efficiency to Woodward and Ruskin's artistic predilections. In his letter to Acland concerning the Gothic style of architecture employed in constructing this laboratory, Ruskin says :—

'Here was the architecture which I had learned to know and love in pensive ruins, . . . here was this very architecture lending itself, as if created only for these, to the foremost activities of human discovery, and the tenderest functions of human mercy. No other architecture, as I felt in an instant, could thus have adapted itself to a new and strange office. No fixed arrangements of frieze and pillar, nor practised refinements of classical decoration, could have otherwise than absurdly and fantastically yielded its bed to the crucible, and its blast to the furnace; but these old vaultings and strong buttresses—ready always to do service to man, whatever his bidding—he had but to ask it of them, and they entered at once into the lowliest ministries of the arts of healing, and the sternest and clearest offices in the service of science.'

Whatever the view now held as to the suitability of Gothic architecture for a museum of scientific collections, and we think that it would generally be an adverse one, there can be no doubt as to its unsuitability for laboratories. For practical work requires the maximum of light, the minimum of decoration where dust can collect, and of high pitched roof and vaultings where draughts are provoked. Hence it was without a pang that in 1902 one saw the gloomy and draughty 'kitchen' cut in half by a dividing floor, to form a lower

room which serves as a passage to the new Radcliffe Library, and gives accommodation for the Ashmolean Society's books, and an upper room which is still used as a chemical laboratory.

Before passing on to describe the buildings connected with the biological sciences, it is convenient to refer briefly to the Astronomical Observatory, which, though not contiguous with the Museum, lies so close as to be practically part of the same institution. Previous to 1873 the Savilian Professor of Astronomy occupied a small building containing a transit and other instruments, lying east of the Museum. In that year Convocation voted him £2,500 for the purchase of a $12\frac{1}{4}$-inch equatorial refracting telescope, and almost simultaneously Dr. de la Rue presented the University with his large reflecting telescope. To house these two instruments suitable buildings were erected in the Parks, adjoining the Museum, and there they remain in use to the present day. In 1877 an additional room, for lecture purposes, was added to the existing block of buildings, and in 1889 de la Rue presented £600 for a second telescope, a 13-inch refractor, for photographic work. This instrument, fitted on the same support as the other refractor, has been in constant use since 1892, in connexion with the international scheme for surveying the heavens. This task has just been brought to a successful conclusion by Professor H. H. Turner, the present Professor of Astronomy.

Considerable as have been the additions to the buildings connected with Chemistry and Physics,

those relating to the Biological and Medical sciences have surpassed them. Between 1860 and 1881 the only biological teaching at the Museum was that given by Dr. George Rolleston, who, as Linacre Professor of Physiology, taught not only Physiology, but Human and Comparative Anatomy, and Anthropology in addition. The University Commissioners of 1877 changed this professorship into one of Human and Comparative Anatomy, whilst the subject of Physiology was detached from it and assigned to a new Chair, the Waynflete Professorship of Physiology. To this Chair Dr. (afterwards Sir John) Burdon-Sanderson was elected in 1882, but there were no laboratories at his disposal. Hence in February, 1883, Convocation voted him without question £1,500 for instruments and apparatus, and three months later notice was given of the intention to ask Convocation to vote £10,000 for the erection of a Physiological Laboratory. This raised a storm of opposition, partly from the professed economists who objected to such great expenditure on Museum buildings, but especially from those persons who objected to the practice of vivisection. After a strenuous debate in which Acland and Burdon-Sanderson took part, the decree was carried by a majority of three (88 to 85). Burdon-Sanderson declared that he did not intend that vivisection experiments should be used for purposes of instruction, but he declined to bind himself not to make such experiments in his private investigations, though he would always in the future, as in the past, do his utmost to avoid causing pain.

This did not satisfy the anti-vivisection party in Oxford. They opposed the formal vote for selling out the stock necessary to provide the money voted, and were defeated by 188 to 147. On this occasion Professor Freeman claimed as an historian 'to be as much a man of science as any one who operated on live rabbits, but he did not ask to be allowed to illustrate the siege of Jerusalem by a repetition of its massacres, or the Elizabethan festivities at Kenilworth by a bull-baiting. He deprecated the establishment in Oxford of a "chamber of horrors"'.[1]

Nothing daunted, the anti-vivisectors proceeded to oppose the vote of an annual grant of £500 for the general upkeep of the Laboratory.

'Acland again defended, urging that the simple question before the House was whether the new building should be handed over in working order or not. The opponents of the vote had made much play by asserting that it "trifled with the morality of the University". "You have already trifled with it," he declared, "by inviting a distinguished professor to Oxford and then casting him aside; by taking the responsibility of checking the advance of medical knowledge and the chance of alleviating the suffering of mankind."'

'The audience would hear no further speeches. Both Professor Dicey and Professor Freeman were inaudible amidst the shouts, and the vote was taken—412 for, 244 against. And thus the matter ended.'[2]

Soon after this stormy period in the history of the Museum opposition to votes for science build-

[1] Atlay, *loc. cit.* p. 425. [2] *Ibid.*, p. 427.

ings practically ceased, and they were almost always carried *nemine contradicente.* This was the case, for instance, as regards the £5,500 voted in 1907 for a new wing to the Physiological Laboratory.

The Chair of Human and Comparative Anatomy was destined, like the original Chair of Physiology, to a further partition in fact if not in name. During his tenure of the Linacre Chair of Physiology, Professor Rolleston had, among his multifarious duties, given instruction in Human Anatomy, and a few students had practised dissection, but the number desirous of such teaching was very small and irregular. At the time of the foundation of the Physiological Laboratory, it was determined that Human Anatomy should be taught in a more systematic way, and in a manner befitting its importance. In 1885 Dr. A. Thomson was appointed Lecturer in Human Anatomy, and in 1886 a temporary building was erected for his use. In 1893 the present permanent building was completed, and has proved to be admirably suited for its purpose.

In purely medical subjects the teaching at the Museum has until recent years been wofully deficient. There seems to have been no teaching whatever until 1891, when the Regius Professor of Medicine (Sir Henry Acland) induced Dr. Carl Menge to come over from Munich for a few months to organize a small Bacteriological Laboratory, and give some instruction in Pathology. But when in 1895 Sir John Burdon-Sanderson relinquished the Chair of Physiology to Professor Gotch, and succeeded to the Chair of Medicine,

he offered regular courses of lectures in Pathology, whilst Dr. J. Ritchie gave practical instruction. In 1899, thanks largely to the munificence of a private benefactor, Mr. Ewan Frazer, the present Pathological laboratory was begun, and was in working order two years later. Other buildings are still needed, however; for important subjects such as Pharmacology and Public Health are unrepresented.

It had always been Acland's wish that the Botanical department should ultimately be transferred from the Botanic Gardens to the Museum, so as to complete the grouping of the sciences, and though this wish is not likely to be fulfilled in its entirety, it has been carried out in small part. The growth in the number of men—chiefly medical students—desirous of elementary instruction in Zoology and Botany was such as to render further accommodation necessary, and so in 1899 a large new laboratory was erected on the north side of the Comparative Anatomy department. This building is used for teaching both elementary Botany and elementary Zoology.

In addition to the buildings mentioned, and those of the Pitt-Rivers Museum referred to below (p. 102), smaller extensions and alterations have been made from time to time in the departments of Comparative Anatomy, Geology, Mineralogy, and Zoology (Hope department), but these scarcely call for special mention.

The immediate effect of the foundation of the Museum upon the study of science in Oxford was not so great as might have been expected, and it

was not until 1869 that the number of students obtaining a class in the Final Honour School of Science showed a distinct increase. Even then only fifteen names appear. In 1876 this number was doubled, but from this year up to 1892 the number kept at thirty or less a year. Since then the increase has been more rapid, and the Science School is now third or fourth in order of magnitude of all the Honour Schools, and is taken by about seventy candidates each year. Of these, nearly half offer Chemistry as the subject of examination, about a third Physiology, and the remainder Physics, Zoology, Botany, or Geology. Doubtless the number of Science students will continue to increase in the future, though it will be long before it compares with that at Cambridge, where Science is the largest of all the Honour Schools.

No less important than the teaching of science to students is the prosecution of original research, and Oxford offers greater facilities to those of its teachers and senior students desirous of extending the bounds of knowledge than almost any other University. The system of short terms and long vacations, though decried by some, is not without advantages. The time of the students during term is so taken up with practical classes and lectures that there is but little opportunity for systematic reading, hence this can be more profitably pursued in vacation. The teachers, released from their official duties, have nearly half the year at their free disposal, and the majority of them devote most of this time to carrying out original investigations. As can be seen from the annual

reports made by the heads of the various departments to the Museum Delegates, the volume of research work produced every year by most departments is considerable, and forms a valuable and notable addition to knowledge.

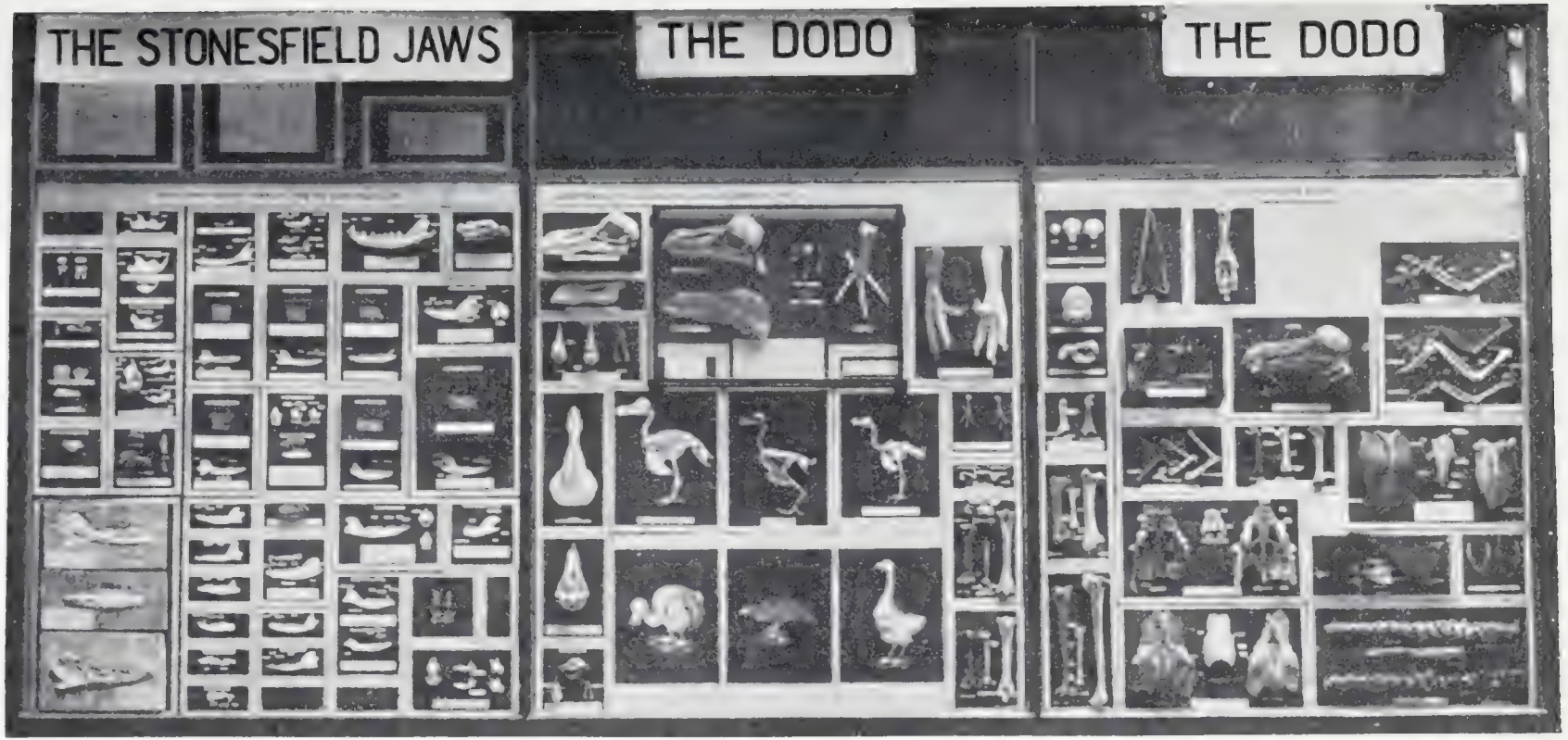
THE COLLECTIONS

In addition to being an aggregation of scientific departments, the Museum is a vast storehouse of scientific collections. These are of very great value to the students working in many of the departments, as well as being objects of interest and instruction to the layman and casual visitor. Many of them have been gradually accumulated since the foundation of the Museum, but the munificent gifts of a few generous donors are responsible for the larger part. One of the chief of these is the Hope collection, referred to in Chapter II. In 1861, by a further endowment, Mr. Hope founded the 'Hope Professorship of Zoology', and this chair was held by Professor Westwood until his death in 1892. The Hope Entomological collection is housed in the upper floor of the south side of the Museum, and since its foundation has increased so rapidly in size as to necessitate its extension, in 1894, into the two adjoining rooms of the south corridor, and in 1903, to a part of the old Radcliffe Library. It includes further considerable gifts of insects from Mr. Hope, and after his death from Mrs. Hope, who purchased and presented many collections of great value, including specimens collected by

Bates in the Amazons, and by Wallace in the Malay Archipelago. Other benefactors are Miss Burchell, who in 1865 presented the Zoological collections of her brother, Dr. W. J. Burchell; Mrs. Tylden, who in 1876 presented the Entomological collection of the Rev. W. Tylden; and Mr. F. D. Godman and Mr. O. Salvin, who in 1896 presented a splendid set of Lepidoptera Rhopalocera. The collection now consists of about 120,000 Lepidoptera, 200,000 Coleoptera, and 140,000 Diptera and other insects, and is one of the largest in the world. It has been arranged by the present head of the department, Professor Poulton, to afford a proper display of the types, and to illustrate the geographical distribution of insects, warning coloration, protective resemblance, and mimicry.

Of the collections under the charge of the Linacre Professor of Comparative Anatomy, the nucleus, as mentioned in the first chapter, came from the Ashmolean Museum, whilst a further considerable addition was transferred in 1860 from the Christ Church laboratory by permission of the Lee's trustees. Sir Ray Lankester, when appointed Linacre Professor in 1891, planned the admirable collection of preserved and dry preparations of the various classes of the animal kingdom now exhibited in the northern half of the Museum court. Some of these preparations represent a week's careful dissection, and with their explanatory labels and diagrams afford most valuable assistance to the students of zoology. A photograph of one of the show-cases containing

PLATE IX



ONE OF THE EXHIBITS IN THE COURT

some of the most treasured possessions of the department is here reproduced. Of the ten known Mesozoic mammalian jaw-bones from the Stonesfield slate, six are here exhibited: likewise the head and claws of the famous dodo.

In addition to these dissected specimens, the Museum court contains a number of mounted skeletons; also of casts, the largest and most remarkable of which is taken from the skeleton of the iguanodon in the Brussels Museum.

The south-west portion of the court contains an admirable mineralogical collection, the most striking features of which are, perhaps, two large table-cases containing a portion of the famous Corsi collection of marbles, presented by Mr. S. Jarratt, the case of meteorites, and the case of precious stones presented to the Museum in 1903 by Mr. E. W. Streeter. The adjoining mineralogical department contains a further large and valuable collection, about a fifth part of which was presented by Professor Storey-Maskelyne during his tenure of the Chair of Mineralogy (1856 to 1895), and much of which was added by his successor, Professor H. A. Miers.

The south-eastern portion of the court, and the adjoining corridors, contains a Geological collection. Among the Tertiary and Post-Tertiary fossils is to be seen the large series of Mammalian remains collected by Dean Buckland from the bone caves of England and the Continent. The fine collection of Saurian remains from the neighbourhood of Oxford is placed in cases on the south side of the court.

The collections are now being re-arranged by the present Professor of Geology, Professor W. J. Sollas, and illustrate the fossils of the formations from the Cambrian to the Chalk. They are placed in the upright cases in the east and south corridors. A large collection of fossils from the Cambrian, Ordovician, Silurian, and Old Red Sandstone, formed by the late Dr. Grindrod, is placed in two cases at the east end of the court.

Striking as are the exhibits in the central court of the Museum, they are equalled or even surpassed by those of the adjoining Pitt-Rivers Museum, an annexe built on to the eastern side of the court in 1883 to house the collection presented to the University by Major-General Pitt-Rivers in 1882. This collection, in which archaeological and ethnological material are brought together, is designed in the main to throw light upon the history of the various human arts, industries and appliances, and the successive stages of their development. Objects of like nature and function are grouped together in synoptic and progressive series, commencing with the more primitive and generalized types and leading gradually up to the higher and more specialized forms, the specimens being arranged, as it were, in genera and species. Not only are the origin and development of arts-appliances illustrated, but also their geographical distribution and local variations, and light is thrown upon the question of the *monogenesis* or *polygenesis* of certain widely distributed arts and implements; also upon their probable lines of dispersal from

PLATE X

THE PITT-RIVERS MUSEUM

one or more centres and, incidentally, upon the migrations of races themselves. The collection includes an extensive Pre-historic series, groups illustrating the development and distribution of various classes of weapons, implements of domestic use, musical instruments, the art of writing, navigation, pottery and textile industries, fire-making, personal ornaments and numerous other products of human activity both on the utilitarian and the aesthetic side.[1] This collection, the most complete of its kind in the world, was placed nominally under the charge of the Professor of Comparative Anatomy (Professor Moseley), but his curator, Mr. H. Balfour, had the care of its arrangement, and, after Professor Moseley's death, it was entrusted to his sole charge. Since the time of the original gift, the collection has been increased every year by numerous and valuable additions, the most striking of which is the gigantic totem post from Queen Charlotte Island, N. Pacific, presented in 1901 by Professor Tylor.

Of the Medical collections, a fine nucleus was acquired by the University in 1864 by the purchase of Professor Van der Kolk's pathological series of 770 preparations. This collection was kept for many years in the small department of medicine at the north-west angle of the Museum, but in 1901, on completion of the Pathological Laboratory, it was transferred to that building, and it has since been largely added to. On the foundation of the department of Human Anatomy

[1] For this description we are indebted to Mr. H. Balfour.

in 1885, no preparations or dissections whatever existed, but these have been gradually accumulated by the head of the department, Professor Thomson, and now form a large and valuable collection. Most of the dissections are the work of the late Mr. Charles Robertson, formerly Aldrichian Demonstrator of Anatomy, and assistant to Professor Rolleston.

The grouping of some of the collections above referred to is roughly indicated on the plan of the Museum buildings in the fly-leaf of this book. They are not separated from one another by any rigid boundaries, and if the visitor starts with the zoological series on the north side of the great court, and works his way round gradually to the eastern, and thence to the southern side, he progresses in due sequence to the palaeontological exhibits, thence to the geological, and thence to the mineralogical.

But scant justice has been done in these few pages to the lavish care exhibited on these collections by their donors and their curators. Adequate appreciation must depend on a study of the collections themselves.

CHAPTER V

THE JUBILEE OF THE MUSEUM

The fiftieth anniversary of the foundation of the Museum was commemorated with all due state on October 8th, 1908. In the morning of that day a Convocation was held in the Sheldonian Theatre, at which a large number of scientific representatives from other Universities and bodies were present. The honorary degree of Doctor of Science was conferred upon Professor Arrhenius, Director of the Department of Physical Chemistry at the Nobel Institute of the Royal Swedish Academy of Sciences, and on Mr. Augustus Vernon Harcourt, M.A., F.R.S., formerly Lee's Reader in Chemistry. Professor Love introduced Professor Arrhenius in the following words :—

Adest nobis iure ornandus Svante Augustus Arrhenius, qui non solum in eo Scientiae Naturalis genere, quod a Physicae et Chemiae confiniis proxime abest, et viam monstravit et ipse palmas plurimas reportavit, sed etiam quaestiones, quae ad Philosophiam Naturalem pertinent, subtilissime tractavit. Qui vir, cum doceret quo modo corpora vi electrica percurrente in elementa,

ex quibus constant, dissolvantur, gloriam insignissimam consecutus est: neque minus insignes sunt eius de orbis terrae origine et vetustate ultima, de fontibus quibus alatur solis calor, de planetarum conditione, possintne animantibus et plantis sedem praebere, luculentissimae quaestiones. Inter eos qui in his rebus versati sunt nescio an omnium primus intellexerit, quanti momenti sit illud, corpora luci obnoxia quasi pondere quodam premi, quod expendi possit. Neque ei satis erat de Chemia, Geologia, Astronomia praeclare mereri: quin his proximis annis hominum utilitatibus inservire voluit, cum medicamina venis iniecta novo more ad pestes arcendas quantum valeant minutissime quaereret.

The Vice-Chancellor, Dr. T. Herbert Warren, President of Magdalen, then admitted Professor Arrhenius with the following words of congratulation:—

Vir eminentissime, acutissime, Linnaei patria dignissime, qui et indagandi subtilitate et vi ratiocinandi, si quis alius vales

Magni primordia mundi,
et rerum causas, et quid natura docere;

Ego auctoritate mea et totius Universitatis libenter admitto te ad gradum Doctoris in Scientia, honoris causa.

Professor Love introduced Mr. Vernon Harcourt thus:—

Musei nostri quinquagesimum iam aetatis suae annum ineuntis natalem diem celebramus. Scientiam etiam Experimentalem apud nos eodem die renatam salutamus. Occasionem hanc nactis ornandus nobis est Augustus Georgius Vernon Harcourt qui et ipse

discipulus inter primos hoc in loco institutos et postea multos per annos inter doctores nostros eminebat. Qui vir cum non uno in genere et Scientiae promovendae et hominum usui profuerit in primis est laudandus quod—in hac quidem re collega usus Professore nostro Saviliano, Willelmo Esson—illam legem naturae invenit, qua elementorum coetus et dissolutiones reguntur, maximo sane chemicorum omnium fructu, qui longe accuratius quam antea res iam investigare poterant. Idem lampada effinxit miro modo sibi constantem, qua usus lucem e sole, vel astro, vel lychno quolibet emissam metiri posset : idem denique rationem excogitavit, qua illius *φαρμάκου νηπενθοῦς* quo utuntur medici tenuissimam quamque guttam expenderet. Harum rerum inventorem non solum de Academia nostra, sed de omnibus qui Scientiae incumbunt, atque adeo de universo hominum genere bene meruisse iure dixerim.

The Vice-Chancellor admitted him with these words :—

Vir ingeniosissime, quem non solum decem lustra, multa cum utilitate multa cum laude scientiae dedita, sed nota animi bonitas, mentis acumen, caritas discipulorum et discipularum innumerabilium, denique familiaritas nec brevis nec infirma, Oxoniae tuae commendant, quemque hodie reducem omnes tam laetis oculis aspicimus ; Ego auctoritate mea et totius Universitatis libenter admitto te ad gradum Doctoris in Scientia, honoris causa.

At the close of the Convocation addresses of congratulation were presented to the Vice-Chancellor on behalf of a number of universities and learned societies ; they were all commendably brief. The Vice-Chancellor then read a communication from

the Chancellor, Lord Curzon of Kedleston, expressing regret that the effects of his recent motor accident prevented his being present. Lord Curzon spoke of the interest with which he watched the development of Oxford as a Scientific University, and referred to the truly regal gift of an Electrical Laboratory by the Drapers' Company. He concluded by saying that there were three main desiderata for the future—unity of spirit in the Museum itself, unity of action between Museum and Colleges, and unity of action between Museum and University.

The Vice-Chancellor then delivered the following address.

Representatives of other Universities, Learned Societies, and Institutions, Ladies and Gentlemen,—My first and pleasant duty is to welcome you on behalf of the University and the Delegates of the Museum, and to thank you for your presence here and the encouragement it gives us on this occasion of our festivity, the celebration of the fiftieth anniversary of the establishment of the University Museum. It should be understood that it is a modest affair. We offer you little in the way of entertainment. You are giving rather than receiving. It is your distinguished presence that confers upon the occasion any external *éclat* that it may have, and yet we hold, and I think you will agree with us, that it is in reality a very important occasion, important for us, and not without importance for the world. It is a landmark in the history of Natural Science at Oxford. Fifty years ago, within the memory of not a few here to-day, the Museum did not exist. Its site was a green field. Now, Natural Science is definitely domiciled and organized among us and Oxford has become a scientific

university. That, I take it, is the meaning of to-day's ceremony. Fifty years is not a long time, it is a very short time, in the history of a great and ancient university. It is only one-sixteenth of the period during which Oxford University has in some sense or another existed. It cannot compare with the 300 years of the Bodleian. We hope that Natural Science may have before it many half centuries and many whole centuries of progress and valuable work. And the question may naturally be asked, Why should Oxford be in such a hurry to celebrate the establishment of an institution which is still, academically, a mere child, or at least only just beginning to pass out of its nonage?

Ladies and gentlemen, it is exactly for that reason we are celebrating the completion of the first fifty years, because we think that it contains the earnest and the assurance of those that are to follow. The first years are very critical years. Infant mortality is, we know, one of the great menaces to life. A child's first one or two birthdays are in this sense its most important. Well, the Museum has passed at any rate through its infantile period; that fractious time of teething which mothers know so well, and which is not unknown to Alma Mater. It is now fairly launched on life.

Science was not a stranger to Oxford before the first stone of the Museum was laid, but her existence was somewhat precarious and her progress intermittent.

The period just before the establishment of the Museum was, like the night before the dawn, a somewhat dark age. It is, I believe, recognized in physiological science that the history of the embryo repeats the history of the race. It appeared to be so with science at that time. She was then in the condition of the cave-dwellers among primitive men.

At any rate, she lived underground. Her teachers, like those of the Early Church, wandered about in 'caves and dens of the earth'. There was a cellar under the Ashmolean where science was taught. If I remember right, my old friend, whom I much wish we could have seen here to-day, Professor Storey-Maskelyne, was both taught, and instructed himself, in that underground chamber. There was another cellar, or series of cellars, in Balliol College where my wife's father, Professor Brodie, used to pursue chemistry. But it would not be fair to represent this as the whole history of science in Oxford even at that time. Dr. Daubeny at my own college, Magdalen, and Dean Buckland, as he afterwards was, at Christ Church, had already done pioneer work. To-day things are very different. Natural science has now, as you will see this afternoon, a palace with many chambers and apartments, well and, it may be said in some instances, beautifully equipped. That is not everything and will not alone secure success. Much of the very best work, as we all know, in science has been done in very inferior quarters and with very poor appliances. About the early days of the Museum I do not propose to speak. My friend, Dr. Vernon Harcourt, as we all rejoice to call him, will do that. Nor do I propose to say much about the previous or general history of science in Oxford. That is a large and not inglorious topic. A very interesting book might, and will, I hope, some day be written about it. But it is a topic with which I am not competent to deal. I will only touch on it in one or two words.

Oxford has had her shining individual names, her great discoverers and thinkers from the days of Roger Bacon down the ages, and her notable series of professors. The astronomers and geometers, Seth Ward and John Wallis, Christopher Wren, David Gregory, James Bradley, Nathaniel Bliss, Henry Smith, Charles

Pritchard; some of these are among the most brilliant in the bead-roll of English science, and all are creditable. The list of her botanists, from Bobart and Dillenius to the Sibthorpes, Lawson, and Bayley-Balfour, is not less notable.

Linacre and Sydenham are two of the greatest names in the history of English medicine. She has had, too, her famous institutions. The Botanic Garden—or, as it used to be called, the 'Physic' Garden—is the earliest of these, and among the earliest of the kind in England or Europe. And we must never forget that Oxford had a museum before the present structure, whose fiftieth anniversary we celebrate to-day. The Ashmolean, dating from 1683, was described in a Latin inscription as 'The Ashmolean Museum, School of Natural History, and Chemical Laboratory'. Here, in the early years of the last century, from 1822 to 1848 Dr. Daubeny gave a series of lectures. They were attended, it is worth recording, by Archbishops Tait, Whately, and Thomson, and by Dr. Pusey, by Sir John Bennett Lawes and Sir Edmund Head, by Dean Liddell and Dean Church, by John Ruskin, and by Sir Henry Acland and Professor Storey-Maskelyne. In 1848 Dr. Daubeny erected a laboratory and lecture room of his own at the Botanic Garden, to which he transferred his work. Christ Church followed suit. Daubeny had succeeded as Professor of Chemistry Dr. Kidd. Dr. Kidd had also been Professor of Mineralogy, but was followed in this chair by Dean Buckland, the founder of modern geology study in Oxford. Buckland, however, left Oxford in 1845, and left it somewhat in the lurch. As my friend, Dr. Bourne, tells me, a letter exists by him in which he says that he despaired of getting Oxford to establish a museum or to undertake the organized teaching of science. Buckland despaired, but a younger member of his own House did not despair. We can never be sufficiently grateful to Sir Henry Acland for

the tact and the tenacity with which he introduced the idea of this foundation and carried it to success, nor ought we to forget our debt to a very different man whose name some of you may be surprised to hear in this connexion, Dr. Pusey. He had, as I said just now, been one of the attendants at Daubeny's lectures. It was with his assent and approval that Acland, as he used to be very fond of recalling, promoted the idea of the Museum, and that the Book of Nature was opened in Oxford side by side with that other open Book which is also a Book of Nature, though not, as used to be thought, of science, and which is the immemorial badge of our University.

But this, ladies and gentlemen, brings me on to Dr. Harcourt's ground, and that, again, I wish to avoid. I would rather occupy the brief time during which I will detain you with a few words about the present position, prospects, and possibilities of science at Oxford. I am not sure that I am much better qualified to deal with this aspect of the question, or indeed that I ought to attempt to speak about it, but I imagine that when my too kind scientific friends—and they have been among the best friends I have had during my now fairly many years of Oxford life—asked me, as Vice-Chancellor, to give a short address on this occasion, it was something of a very general, amateur, and lay character which they expected. This much I may make claim to, that I have always had a strong interest in natural science. When a boy—quite a small boy—I came, fortunately for myself, within the sphere of influence of a family to whom English science owes a great deal, that of Dr. W. B. Carpenter. I attended lectures, I saw experiments, what is more I made experiments for myself in electricity, in physics, but especially in chemistry.

Then I passed to Clifton College, a school which was at that time, under the Bishop of Hereford, one of the

pioneer schools in the teaching of science, and I was fortunate in coming into contact with teachers, brilliant and eminent, such as Professor John Perry and Dr. Heinrich Debus. I also made some attempt to pursue zoology and anatomy. When I came to Oxford I was obliged to concentrate on the ordinary classical course. The moment I had completed that, I returned for a short time to my first loves, and I am always glad to think that I worked for a term or two in the 'Glastonbury Kitchen'. I cannot profess to have taken science very seriously, nor did I make any great advance, but I kept alive my interest. It was, if I remember right, about ten years later, in 1887, just one-and-twenty years ago, that Dean Liddell asked me to become a Delegate of the University Museum. I have served continuously as a Delegate since that time. It will be seen, therefore, that I have just attained my majority in that capacity, and I can say with sincerity that there is no work in the university of the kind in which I have been more continuously interested or have more enjoyed. This personal account may seem a little egotistical. I hope you will pardon it. I have only put it forward to show that I have some little claim to speak at any rate with some general experience and personal knowledge about science in Oxford. It will be seen that of the fifty years which we are considering, my own personal acquaintance extends over about two-thirds. For the first years of that period I knew it as an undergraduate through my undergraduate friends. I then had a brief acquaintance with it as a student and later a constantly-increasing acquaintance as a Delegate of the Museum. One of the first recollections of the kind that I have is of the death of the first Keeper, Professor Phillips; of the shock which that occasioned, and of the way in which his work and services were spoken of in the university. With the second Keeper I am glad to say I can recall

an intimate and personal acquaintance. Who but must rejoice to have known the brilliant and delightful Henry Smith, that luminous and illuminating intellect, that coruscating and lambent wit? With the third illustrious Keeper, the father, and largely the founder, of English anthropology, Dr. Tylor, I was thrown into very close and continuous relation. His successor, the Secretary, whose loss we deplore more than we can trust ourselves to say, Professor Miers, has been a Fellow of my own college and one of my most intimate friends. I have seen the Museum, then, and its work, growing and advancing for something over thirty years. I can recall the individual characteristics and work of the eminent professors who have served it in its different departments during this period, the brilliant zoological series of Rolleston, Moseley, Lankester, and Weldon, and the brilliant geological series of Phillips, Prestwich, Green. I can remember the introduction of physiology and the epoch-making advent of Sir John Burdon-Sanderson. All along the line there has been continuous, steady, and healthy growth. I do not know how the number of students nor the departments of the Museum now would compare with that of the numbers when I was an undergraduate. But I will take one simple test. I find that in 1872, the year I came to Oxford, the number of names in the Natural Science honours list is 13. The number of names last term in the corresponding list is 74, six times as many. When I was an undergraduate the Oxford Medical School was the shadow of a mighty name. The medical student was a *rara avis*. My impression is that there was one, or at the most two, a year at Balliol when I was there, and in the whole university I should doubt whether there were a dozen. In the strict sense there were hardly any. That is to say, there was scarcely a student studying medicine in any of its branches within the university. Now all

that is changed. We have been singularly fortunate in our series of medical professors, Sir Henry Acland, Sir John Burdon-Sanderson, Dr. Osler. It would be difficult to show a more brilliant trio or a trio more suited to complement, and supplement, each other's labours. I have always held, and I think that experience has justified the belief, that a strong medical school would be for the advantage of pure science in Oxford. Out of practical schools, if properly administered, research work grows, just as again research gives ever new life to practical studies. I think the same is true of practical studies like Forestry, which we have recently introduced; Agriculture, a still later introduction; and Engineering, which I am rejoiced to think is just going to commence its work here. It will be seen, then, that science has made an immense advance in Oxford. Hardly less remarkable than its own advance has been its influence on the other studies of the place. I believe that most, if not all, of our serious, advanced students in other lines would say—I know that many of them have said—that the methods and example of natural science have had a profound influence on their own studies. They have in particular enormously encouraged the idea of original research, the idea of the desirability of *true* knowledge and of *new* knowledge. And yet I think one thing is needful. With all this activity in its own field, natural science does not really affect, as it should, the minds of the rank and file of our able young students here. It is not brought home to them; they do not appreciate or understand it. They either still retain some of that old prejudice and contempt which regarded science at school as an *extra* or a *fad*, or else they are indifferent to it. Some few years ago I remember Professor Lankester complaining that our statesmen and public men generally, reared in our public schools and at the old universities, were insensible of, indifferent to, the

claims of science. I think that while he spoke strongly, as he often does, he also spoke as he not seldom does, even when he speaks strongly, with reason. This ought not to be the case. It is the scientific attitude and frame of mind, the scientific outlook on the world, as a part of general culture, which is, I think, what is wanted in education, and particularly in Oxford education, to-day. Oxford has many great intellectual traditions. Some of them are less strong than they were, but they are still potent. The old scholastic tradition, partly theological, partly philosophical, partly logical, is still potent with us. Our predominating school, even if it is now only *prima inter pares*, is the philosophical school of *Literæ Humaniores*. It affects insensibly and indirectly even those who never read for it. It is an admirable tradition. So again is the more literary tradition of our Classical Scholarship. I hope that these traditions will always be maintained. I think they do to some extent affect the scientific student here. I should like to see them affect him more than they do, and I believe that I should carry many of the leading men of science with me in that desire. But what I should also like to see is the classical and the literary, the philosophical and the theological student, more affected by science. I should like to see science an element in our general education both in our schools and in the universities, and we are told, and I believe it is true, that if we wish to have it in the schools, we must insist on having it in the university. It is not so much that I think that the small amount of actual knowledge which would be acquired by the individual student would be of great value, but I believe it would conduce to the creation of this general atmosphere which I desire to see created.

In the old days it was thought that every gentleman ought to have some tincture of the classics. To acquire it he came to Oxford. There was a good deal

of absurdity in this view, but it meant the existence of a tradition and atmosphere of culture. The gentleman of those days would have been ashamed not to know that Minerva sprang, or was believed to have sprung, from the head of Jupiter. His attitude in this matter was part of a customary recognition of what was of importance and value in the world. He would not have been ashamed of not knowing that water was composed of oxygen and hydrogen. That is a fact, I venture to think, of more importance in itself. That such a fact should be generally known is also of importance as a recognition of what is of value. The real lessons of science do not, however, consist merely in knowledge of facts of this sort. They consist in the recognition of the importance of truth, of absolute scrupulous accuracy; that nothing happens without a cause and without a consequence; that matter, however mutable it may be, is indestructible; that the same elements, or many of them, as are found in our earth may be found, for instance, in the sun, and probably pervade the universe; that energy in the same way is imperishable; the general scientific conception of force, of atoms, of gravitation, of resistance, of mass, of proportionate combination, and the methods by which these truths were discovered and can be again demonstrated—these are the things which ought to be part of our common heritage and knowledge. I hope the next era will see, not the decay or the obliteration of the old traditions, but the addition of the new. I think the man of letters has much to learn from the man of science. I have indicated some of the lessons which in my judgement he may with advantage derive from coming into contact with scientific ideas and methods. I think no less that the man of science has much to learn from the man of letters. It has certainly been the case that the best men, or many of the best men of science have been men full of the love and spirit of

letters, keenly sensible of the beauty and attraction both of poetry and of prose. It was the case, as we all know, with Huxley and with Tyndall. It was so with Helmholtz, whose intellectual relation to Goethe is a most interesting episode. The fact is not so generally recognized, but it was the case with Darwin. It may seem a paradox to say that Darwin was a 'man of letters', but I am almost prepared to maintain it. Too much has been made of the well-known passage in his autobiography in which he describes how he lost, through atrophy, his love for poetry, and not enough has been made of the warmth and the keenness of that love in his earlier days. He was a boy at Shrewsbury in the ultra-classical days of that very classical school, and was rebuked by Dr. Butler, the head master, who called him a '*pococurante*' because he worked at chemistry. But he tells us that he was very fond at school of the *Odes* of Horace; and when we find him, in that delightful book, the *Voyage of the Beagle*, quoting in a few consecutive pages lines from the *Third Aeneid* of Virgil and from Shelley, in the most natural and spontaneous manner, I think we may assert that his love of letters was lively and deep, and likely to have a permanent effect on himself. I have always thought some of the pages of the *Origin of Species*—for instance the concluding pages—among the most poetical pieces of prose in the English language, and I think the secret of that style is to be found partly in the hereditary gift of his family, and partly in the early cultivation which it received. Again, few things are more fascinating to the thinker than the history of early Greek philosophy—those wonderful guesses (afterwards passed on to the Romans) with which the Greek thinkers anticipated in an intuitive and inexact manner the theories and demonstrations of later science. I would have the student of Dalton familiar with the guesses of Democritus and their repetition by Lucretius,

and familiar, if possible, with them in their place in history. I would have the student of Aristotle read Darwin, and the student of Darwin read, as Huxley did, his Aristotle. It is not necessary to learn Greek in order to do this. Indeed, my own opinion is that the distaste produced by the compulsory acquirement of a smattering of Greek is often accountable for the unwillingness to see anything reasonable or valuable in the literature of Greece. I believe that through good translations or expositions much might be communicated which would be interesting and suggestive to an intelligent young student of science.

Ladies and gentlemen, we stand at a very important moment in the history of science in Oxford. It is a moment of a great loss and a great gain. I have already spoken of the loss; it is the departure of the Secretary of the Delegates. Let me speak of the gain. We have had in the fifty years just past many notable benefactions—one a very handsome one from the Drapers' Company. But I doubt whether we have ever had a more handsome or opportune benefaction than that with which, thanks to the splendid liberality of that company which has done so much for the things of education and learning, we are about to begin our next half-century, their magnificent and munificent offer to build and equip an electrical laboratory at a cost of some £23,000.

I hope those of you who are so well qualified to judge, and who will have the opportunity of seeing for yourselves to-day, will think well of the present position of Oxford science. It is invidious to speak of the living or the present, but I will venture to say this, that I am proud of and grateful to our present large and yet ever-increasing staff of scientific teachers. I am sure that they are not inferior—they are, taken altogether, superior—to any body of scientific teachers Oxford has ever had. I look forward with much confidence to the

results which the next few years will produce. I have said that fifty years is a short time in the history of a university, but it is a longish time in the history of an individual. Only the younger here can hope to be here fifty years hence or to see the centenary of the Museum. There is something I think especially pathetic in the contrast between man's short span and the vast scope of the facts and phenomena and ideas to which his science introduces him. My friend, Professor Turner, in a brilliant lecture which I have just been reading, has traced for us the history of the discovery of the periodicity of Halley's comet. Strangely enough its period almost coincides with the recognized span of human life. Few can see it twice, very, very few can remember it twice, and fewer still can twice witness it with mature intelligence. Professor Turner quotes in his lecture a most interesting investigation by Mr. J. R. Hind, confirmed by Messrs. Crowell and Crommelin, of the probable appearances of Halley's comet at periodic intervals in the history of the past, that long backward and abysm of time, carrying it back with certainty to B.C. 87, and with probability to B.C. 240. He also throws his mind forward and anticipates the end—how far off I know not—when the comet will break up into a meteor shower. That end we none of us shall see, but I suppose many of the periodic returns may be anticipated by the astronomers. It is thus that the matter appears to the man of science. How does it appear to human emotion and in poetry? There is a tiny, but striking poem, by that remarkable writer of our own day, Mr. Thomas Hardy, called, 'The Comet at Yell'ham,' which gives the answer, which I will venture to quote:—

It bends far over Yell'ham Plain,
And we from Yell'ham Height,
Stand and regard its fiery train
So soon to swim from sight.

It will return long years hence, when
As now its strange swift shine
Will fall on Yell'ham, but not then
On that sweet form of thine.

It is the same with these jubilees, centenaries, and celebrations. Yet as we look back, so we look forward, and in imagination picture to ourselves our successors entering into our labours, as we have succeeded to those of the past. Surely the idea should make us more earnest and diligent in attacking our tasks of to-day.

In the afternoon, before a crowded audience, Dr. Vernon Harcourt delivered a very interesting and amusing address in the large lecture-room of the Museum on the early history of the Museum. Numerous quotations from his address have been introduced in the first three chapters of this short history.

The ceremony was brought to an end by the presentation of a marble bust of W. F. R. Weldon, late Linacre Professor of Comparative Anatomy, whose loss to Zoology, especially in its biometrical aspect, leaves a gap which it is impossible to fill. The gift was accepted by the Vice-Chancellor, who then unveiled the bust. It stands in the Museum court near to the department of Comparative Anatomy, and is from the hands of Mr. Hope Pinker, who is likewise responsible for the striking and life-like bust of Sir John Burdon-Sanderson, to be found in the court on the right-hand side near the entrance.

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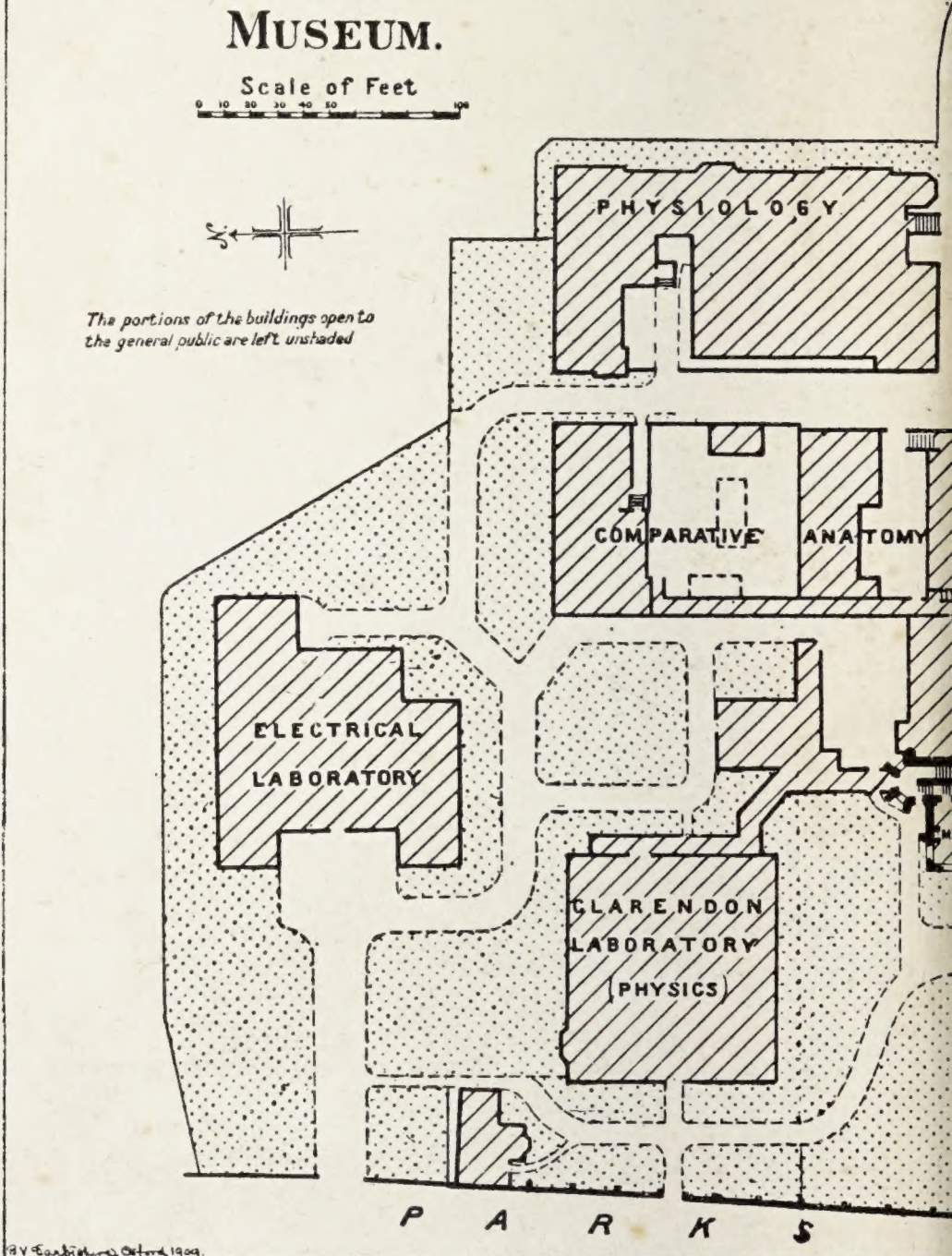
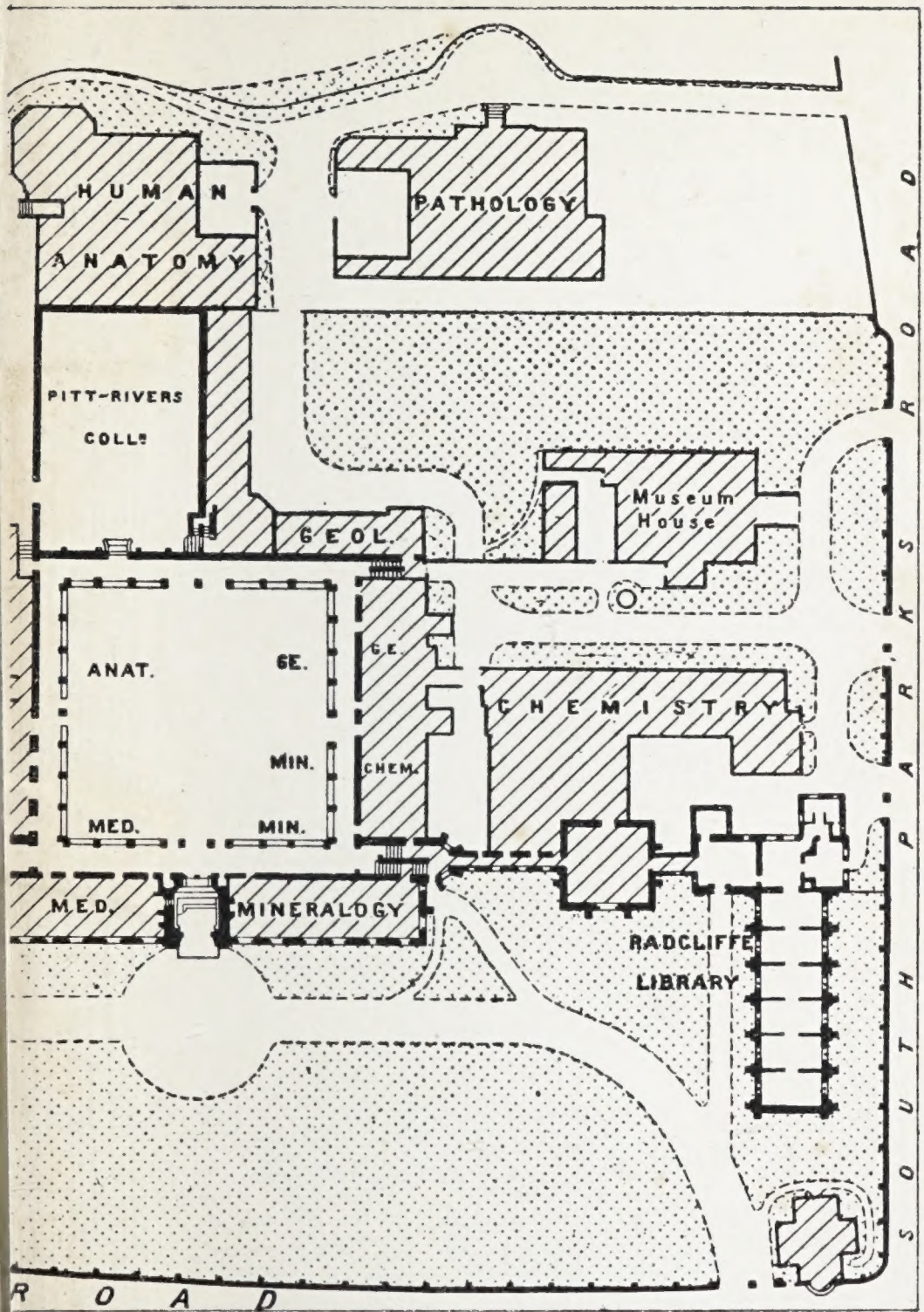


W. V. Cockerell, Oxford, 1909.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